Build a Virtual Private Cloud (VPC)

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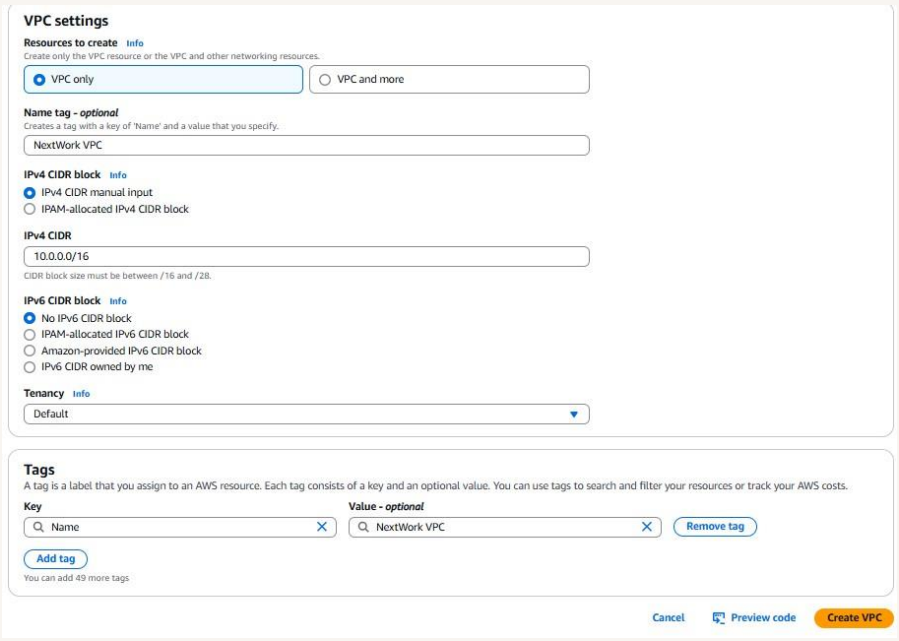


Introducing Today's Project!

What is Amazon VPC?

Amazon VPC (Virtual Private Cloud) is a fundamental AWS service that enables you to create isolated virtual networks within the AWS cloud environment. What makes it particularly valuable is the comprehensive control it provides over your network infrastructure. You can define your own IP address ranges, configure subnets according to your specific needs, and customize routing tables to direct traffic exactly where you want it. This level of control significantly enhances security by allowing you to isolate resources and implement multiple layers of access controls, creating a foundation for secure cloud deployments.

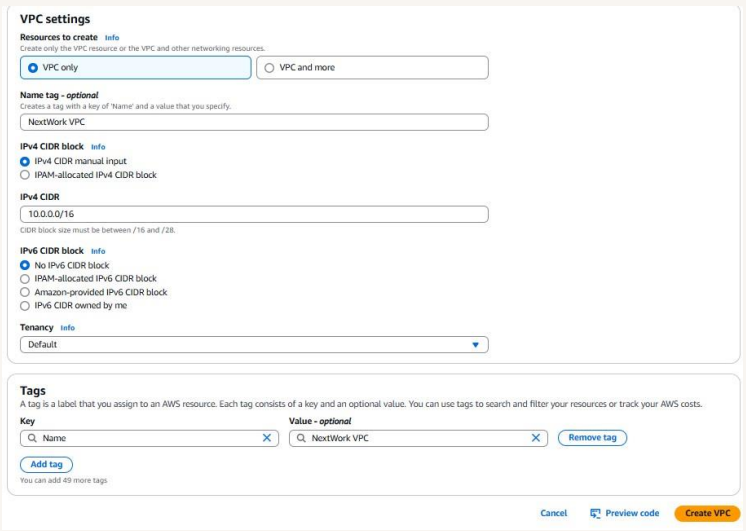
How I used Amazon VPC in this project

For today's project, I built a custom VPC with a public subnet to host internet-accessible resources. I began by defining a 10.0.0.0/16 CIDR block for my VPC, which provided a generous pool of IP addresses. Within this VPC, I created a subnet with a more specific CIDR range (10.0.0.0/24) to organize my resources efficiently. To ensure resources in this subnet could communicate with the internet, I enabled the auto-assign public IPv4 setting and attached an internet gateway to my VPC. This configuration established the necessary pathway for my resources to be accessible from the public internet while maintaining the security benefits of a controlled VPC environment.

Virtual Private Clouds (VPCs)

VPCs serve as isolated virtual networks within AWS that create a private, secure environment for your cloud resources. They provide the flexibility to organize resources logically, control traffic flows between different application tiers, and establish connection rules without exposing your infrastructure to the public internet.

I discovered that my AWS account already contained a default VPC since creation. AWS implements this automatically to ensure users can immediately begin using services like EC2 without first needing to learn complex VPC configuration details.When setting up my custom VPC, I needed to define an IPv4 CIDR block, which specifies the range of IP addresses available within the network. The 10.0.0.0/16 block I selected provides 65,536 possible address (ranging from 10.0.0.0 to 10.0.255.255), offering ample capacity for various resources and proper network segmentation.

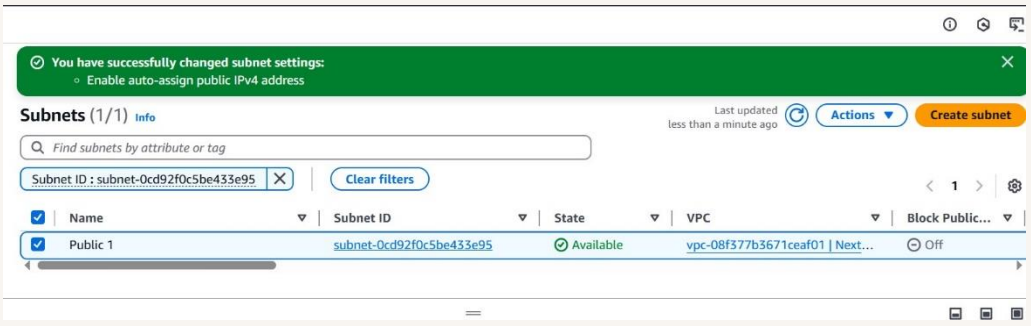


Subnets

Subnets are subdivisions within a VPC that segment your network. There are already subnets existing in my account, one for every Availability Zone in my region. Each has its own CIDR block within a specific AZ.

Once I created my subnet, I enabled auto-assign public IPv4 addresses. This setting ensures EC2 instances launched here automatically receive public IPs to communicate with the internet.

The difference between public and private subnets are their internet access. For a subnet to be considered public, it has to have a route to an internet gateway. Without this route, it remains isolated.



Internet gateways

Internet gateways are essential VPC components that establish connectivity between your VPC and the public internet. They serve dual purposes: functioning as targets for internet-bound traffic in route tables and performing Network Address Translation (NAT) for instances with public IP addresses, enabling bidirectional communication between your VPC resources and the internet.

Attaching an internet gateway to a VPC is a crucial step that enables resources to communicate with the internet, provided they have public IP addresses and appropriate route table configurations. Had I omitted this step in my implementation, my resources would remain unable to reach the internet even if assigned public IP addresses, as the gateway provides the actual connection point to the external network.