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Build a Virtual Private Cloud (VPC)



MD. Fahim Parvez

The screenshot shows the 'Create VPC' page in the AWS VPC console. The page title is 'Create VPC' with an 'Info' link. A descriptive text states: 'A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.' Below this is a 'VPC settings' section. Under 'Resources to create', the 'VPC only' radio button is selected. A 'Name tag - optional' field contains 'NextWork VPC'. Under 'IPv4 CIDR block', the 'IPv4 CIDR manual input' radio button is selected, and the CIDR block '10.0.0.0/16' is entered. At the bottom of the page, there are links for 'CloudShell', 'Feedback', and 'Console Mobile App', along with copyright information: '© 2026, Amazon Web Services, Inc. or its affiliates.' and links for 'Privacy', 'Terms', and 'Cookie preferences'.



MD. Fahim Parvez

NextWork Student

nextwork.org

Introducing Today's Project!

In this project, I will demonstrate Virtual Private Cloud(VPC) by creating an Amazon VPC, creating a public subnet, and creating an internet gateway. I'm doing this project to learn cloud Networking and Amazon VPC

What is Amazon VPC?

Amazon VPC is a logically isolated virtual network in AWS where you can launch and manage resources like EC2 instances and databases. It is useful because it allows you to control IP addressing, subnets, routing, and security, providing a secure and customizable environment for your cloud resources.

In today's project, I used Amazon VPC to create subnets and create an internet gateway, and launch a VPC in seconds using CloudShell and AWS CLI

Personal reflection

This project took me about 1.5 hours to complete because I was writing in my notes and documenting this project at the same time. But without any of this, it should take only an hour and less than 45 mins if I do it regularly.



MD. Fahim Parvez

NextWork Student

nextwork.org

One thing I didn't expect in this project was how easy it was to build a Virtual Private Cloud using both the console and CLI

MD. Fahim Parvez

NextWork Student

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Virtual Private Clouds (VPCs)

What I did in this step

In this step, I will create a VPC because this is the first step to learning VPC

How VPCs work

VPCs (Virtual Private Clouds) are logically isolated virtual networks in the cloud that let you launch and manage cloud resources in a secure, customizable networking environment. A VPC is like your own private network inside a cloud provider (such as AWS), where you control: IP address ranges Subnets (public and private) Routing and traffic flow Network security

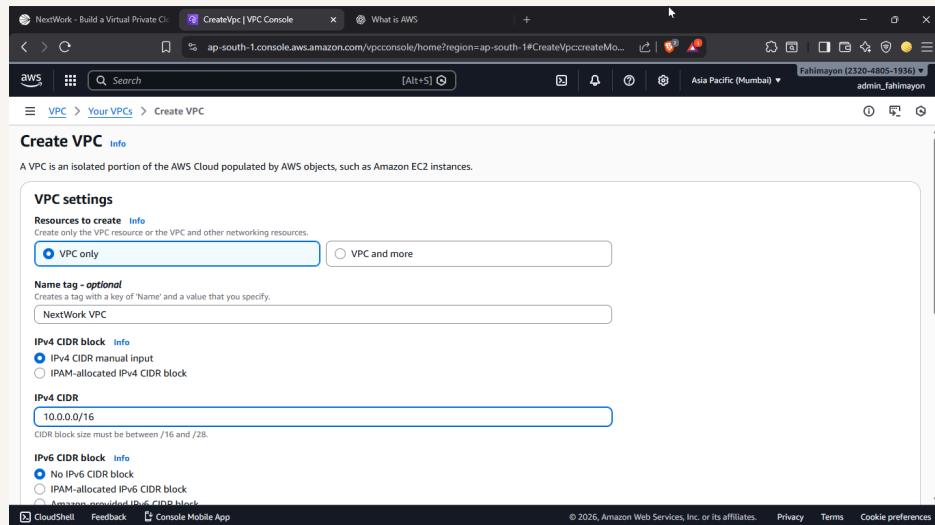
Why there is a default VPC in AWS accounts

There was already a default VPC in my account ever since my AWS account was created. This is because AWS provides a default VPC so users can quickly launch resources without manually configuring networking components.

MD. Fahim Parvez

NextWork Student

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Defining IPv4 CIDR blocks

To set up my VPC, I had to define an IPv4 CIDR block, which is a range of IPv4 addresses written in a compact format that defines how many IP addresses are available in a network. CIDR stands for Classless Inter-Domain Routing. It replaces the old class-based IP system and allows flexible network sizing. For this project i used IPv4 CIDR block 10.0.0.0/16

MD. Fahim Parvez

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Subnets

What I did in this step

In this step, I will launch a subnet inside my VPC because subnets define where resources run within the VPC and allow me to separate public and private resources.

Creating and configuring subnets

Subnets are smaller network segments within a VPC that define a range of IP addresses where AWS resources can be launched. There are already subnets existing in my account, one for every Availability Zone in the region, created automatically as part of the default VPC.

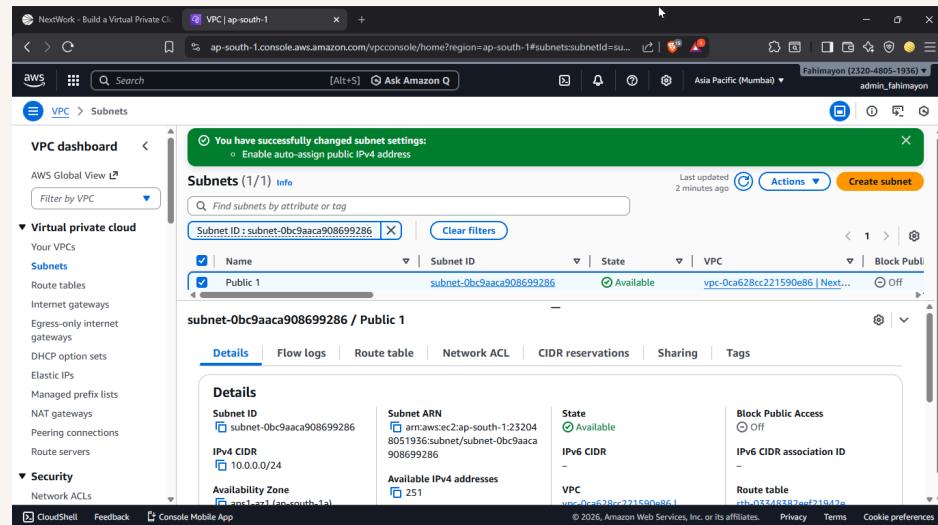
Public vs private subnets

The difference between public and private subnets is whether resources in the subnet can directly access the internet. For a subnet to be considered public, it has to have a route in its route table that sends internet-bound traffic (0.0.0.0/0) to an Internet Gateway (IGW).

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Auto-assigning public IPv4 addresses

Once I created my subnet, I enabled auto-assign public IPv4 address. This setting makes sure that any EC2 instance launched in this subnet automatically receives a public IP address, so that the instance can communicate directly with the internet without requiring additional manual configuration.



MD. Fahim Parvez

NextWork Student

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Internet gateways

What I did in this step

In this step, I will create an Internet Gateway because it allows resources in my VPC's public subnet to connect to the internet.

Setting up internet gateways

An Internet Gateway is a VPC component that enables internet connectivity for resources in public subnets.

Attaching an Internet Gateway to a VPC means linking the gateway to the VPC so it can be used as a routing target for internet-bound traffic. If I missed this step, resources in the VPC would not be able to send or receive traffic from the internet, even if the subnet is public and has correct route table entries.

MD. Fahim Parvez

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The screenshot shows the AWS VPC console with the URL ap-south-1.console.aws.amazon.com/vpcconsole/home?region=ap-south-1#internetGateway:detail. The page displays the details of an Internet Gateway named "igw-0f69ddaf9c517d712 / NextWork IG". The "Details" section shows the Internet gateway ID (igw-0f69ddaf9c517d712), State (Attached), VPC ID (vpc-0ca628cc221590e86 | NextWork VPC), and Owner (232048051936). The "Tags" section lists one tag: Name (NextWork IG). The left sidebar shows navigation options for VPC dashboard, AWS Global View, Virtual private cloud (Your VPCs, Subnets, Route tables, Internet gateways, Egress-only internet gateways, DHCP option sets, Elastic IPs, Managed prefix lists, NAT gateways, Peering connections, Route servers), Security (Network ACLs), and CloudShell, Feedback, Console Mobile App.



MD. Fahim Parvez

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Using the AWS CLI

What I'm doing in this extension

In this project extension, I will open a handy tool (called AWS Cloudshell) to run commands, run AWS CLI commands to set up a VPC, subnet, and internet gateway. Because to try an alternative way by using the AWS CLI to launch my VPC's resources and report back on whether it was a faster, more efficient way to do this project. And showcase this skill in my project documentation

Exploring CloudShell and CLI

VPC resources could also be created with CloudShell, which is a browser-based shell provided by AWS that lets you run AWS CLI commands without installing anything locally. CLI is the Command Line Interface, a tool that allows you to interact with AWS services by typing commands, automating tasks, and managing resources programmatically.

Debugging my setup

To set up a VPC or a subnet, you can use the command `aws ec2 create-vpc --cidr-block <CIDR_BLOCK>` or `aws ec2 create-subnet --vpc-id <VPC_ID> --cidr-block <SUBNET_CIDR>`. Make sure to avoid errors by including the correct CIDR blocks, VPC IDs, and region flags if needed (e.g., `--region us-east-1`), and ensuring there are no overlapping IP ranges.

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```
~ $ aws ec2 attach-internet-gateway --vpc-id vpc-0c59f4e406534a57e --internet-gateway-id igw-01beb763919f1baa/
```

Comparing CloudShell vs AWS Console

Compared to using the AWS Console, an advantage of using commands is that you can automate tasks, manage multiple resources quickly, and use scripts for repeatable deployments. An advantage of using the Console is that it provides a visual interface, making it easier to understand networking, see relationships between resources, and reduce mistakes for beginners. Overall, I preferred the Console for learning and visual understanding, but I see the CLI/CloudShell as powerful for automation and efficiency.



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