

# 17. VIRTUAL PRIVATE CLOUD (VPC)

A virtual private cloud (VPC) is a virtual network that closely resembles a traditional network that you'd operate in your own data centre, with the benefits of using the scalable infrastructure of Amazon Web Services (AWS).

Amazon Virtual Private Cloud (Amazon VPC) enables you to launch Amazon Web Services (AWS) resources into a virtual network that you've defined.

You can create isolated networks for your applications or clients.

**VPC:** A *virtual private cloud* (VPC) is a virtual network dedicated to your AWS account. It is logically isolated from other virtual networks in the AWS cloud. You can launch your AWS resources, such as Amazon EC2 instances, into your VPC. You can configure your VPC; you can select its IP address range, create subnets, and configure route tables, network gateways, and security settings.

**Subnet:** A *subnet* is a range of IP addresses in your VPC. You can launch AWS resources into a subnet that you select. Use a public subnet for resources that must be connected to the Internet, and a private subnet for resources that won't be connected to the Internet.

**Route Table:** A *route table* contains a set of rules, called *routes*, that are used to determine where network traffic is directed.

Each subnet in your VPC must be associated with a route table; the table controls the routing for the subnet. A subnet can only be associated with one route table at a time, but you can associate multiple subnets with the same route table.

**Internet Gateway:** An Internet gateway is a horizontally scaled, redundant, and highly available VPC component that allows communication between instances in your VPC and the Internet. It therefore imposes no availability risks or bandwidth constraints on your network traffic.

**An Internet gateway serves two purposes:** to provide a target in your VPC route tables for Internet-routable traffic, and to perform network address translation (NAT) for instances that have been assigned public IP addresses.

**Network ACLs:** A *network access control list (ACL)* is an optional layer of security for your VPC that acts as a firewall for controlling traffic in and out of one or more subnets. You might set up network ACLs with rules similar to your security groups in order to add an additional layer of security to your VPC.

Scenario	Usage
Scenario 1: VPC with a Single Public Subnet	Your instances run in a private, isolated section of the AWS cloud with direct access to the Internet.
Scenario 2: VPC with Public and Private Subnets (NAT)	In addition to containing a public subnet, this configuration adds a private subnet whose instances are not addressable from the Internet. Instances in the private subnet can establish outbound connections to the Internet via the public subnet using Network Address Translation (NAT).
Scenario 3: VPC with Public and Private Subnets and Hardware VPN Access	This configuration adds an IPsec Virtual Private Network (VPN) connection between your Amazon VPC and your data center - effectively extending your data center to the cloud while also providing direct access to the Internet for public subnet instances in your Amazon VPC.
Scenario 4: VPC with a Private Subnet Only and Hardware VPN Access	Your instances run in a private, isolated section of the AWS cloud with a private subnet whose instances are not addressable from the Internet. You can connect this private subnet to your corporate data center via an IPsec Virtual Private Network (VPN) tunnel.