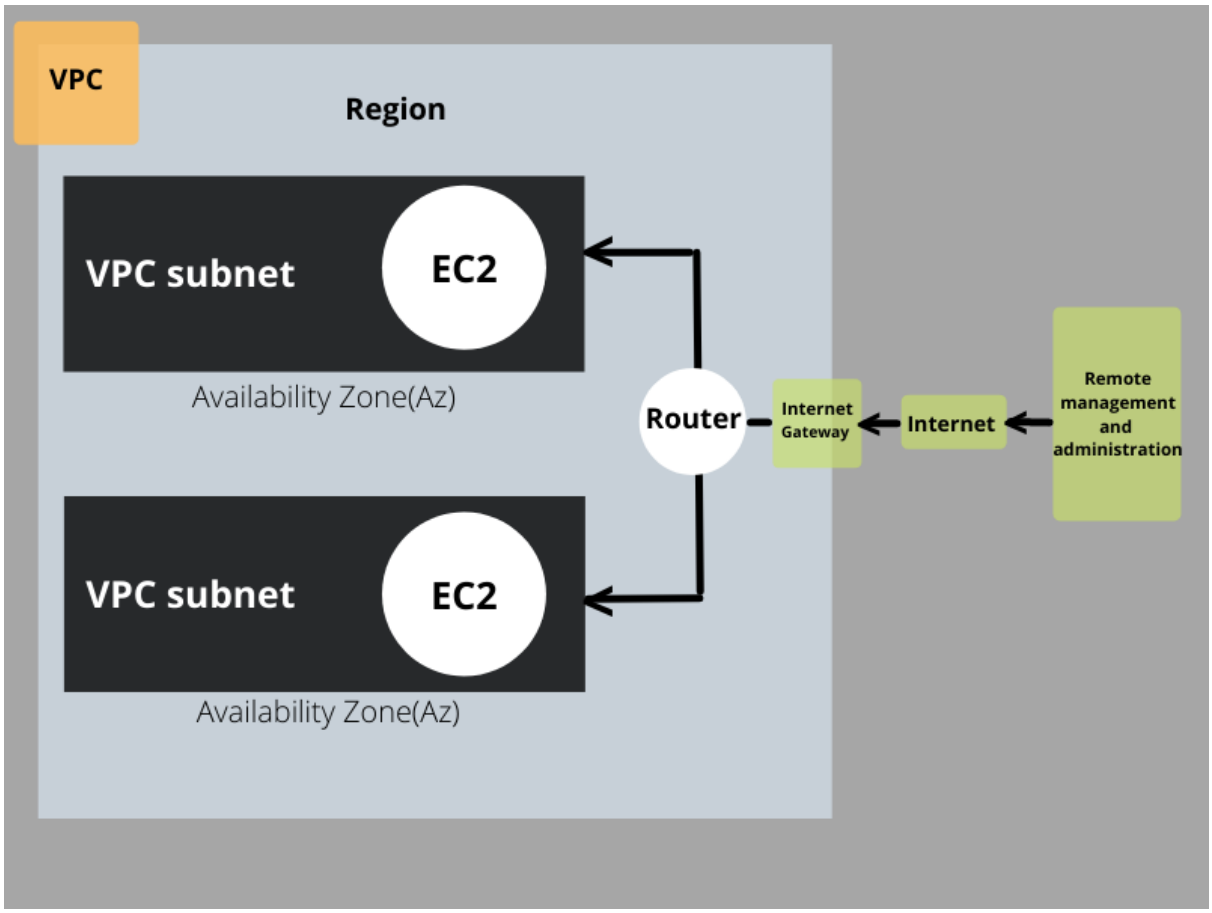
What are the key components of a VPC?



Component	What It Is	Why It's Essential
Subnets	Subdivisions of your VPC's IP address range that segment resources across different availability zones	**Organization & Availability**: Enable resource isolation, implement security boundaries, and distribute workloads across multiple AZs for high availability and fault tolerance

Internet Gateway (IGW)	A horizontally scaled, component that provides internet access to resources in public subnets	**Internet Connectivity**: Essential for public-facing resources like web servers, load balancers, and bastion hosts that need bidirectional internet access
Route Tables	Collections of rules (routes) that determine where network traffic is directed within your VPC and to external networks	**Traffic Control**: Critical for defining network paths, controlling traffic flow, and ensuring packets reach their intended destinations efficiently
Security Groups	Stateful virtual firewalls that operate at the instance level, controlling inbound and outbound traffic	**Instance-Level Security**: Provide granular access control, support application-specific security policies, and maintain connection state for simplified rule management
Network Access Control Lists (NACLs)	Stateless subnet-level security filters that control traffic at the subnet boundary	**Defense in Depth**: Add an additional security layer beyond security groups, provide subnet-wide protection, and enable network-level access control
NAT Gateway/Instance	Managed service that enables outbound internet connectivity for resources in private subnets	**Secure Internet Access**: Allow private resources to download updates, patches, and external data while maintaining security by preventing inbound internet connections
VPC Endpoints	Private connectivity points that allow direct access to AWS services without internet routing	**Security & Cost Optimization**: Eliminate internet gateway dependencies, reduce data transfer costs, and improve security posture for AWS service communications
Peering Connections	Direct network connections between VPCs that enable resource sharing	**Multi-VPC Communication**: Enable secure, low-latency connections between VPCs across regions or accounts without internet routing
Virtual Private Gateway (VGW)	AWS-managed VPN concentrator that connects your VPC to on-premises networks	**Hybrid Cloud Connectivity**: Essential for extending on-premises infrastructure to AWS, enabling secure site-to-site connections and hybrid architectures

✅ MCQ: What are the key components of a VPC?

Q1. Which of the following are key components of a VPC? (Select all that apply)

A) Subnets

B) Security Groups

C) Route Tables
D) IAM Policies

Correct Answer: A) Subnets, B) Security Groups, C) Route Tables *(IAM Policies are part of access control, not core VPC networking components)*

Q2. What is the function of an Internet Gateway in a VPC?
A) It provides DNS resolution for EC2 instances
B) It allows instances in the VPC to connect to the internet
C) It stores encrypted traffic logs
D) It restricts traffic within the subnet

Correct Answer: B) It allows instances in the VPC to connect to the internet

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Q3. What is the purpose of a NAT Gateway in a VPC?
A) To route public traffic to private subnets
B) To enable **outbound internet** access for instances in private subnets
C) To store static website content
D) To attach IAM roles to EC2 instances

Correct Answer: B) To enable outbound internet access for instances in private subnets

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Q4. What does a route table in a VPC do?
A) It encrypts the traffic flowing between subnets
B) It controls the traffic flow between resources and networks
C) It stores the metadata for EC2
D) It handles autoscaling for the VPC

Correct Answer: B) It controls the traffic flow between resources and networks

Q5. What role do Network Access Control Lists (NACLs) play in a VPC?

A) They assign IP addresses to instances
B) They monitor billing and usage
C) They provide stateless, subnet-level traffic filtering
D) They manage user login credentials

Correct Answer: C) They provide stateless, subnet-level traffic filtering