**vpc**

1. **What is the default VPC and how is it different from a custom VPC?**
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19. **What is the role of an ENI (Elastic Network Interface)?**

ANSWERS

1. **What is the default VPC and how is it different from a custom VPC?**
   * 1. **The default VPC is preconfigured with subnets, a route table, and an internet gateway. A custom VPC allows you to customize CIDR blocks, subnets, and routing.**
2. **Can you associate multiple security groups with an EC2 instance?**
   * 1. **You can associate up to five security groups per instance.**
3. **What is a NAT Gateway, and why is it used?**
   1. **A NAT Gateway allows private instances (no public IP) to access the internet for updates without exposing them to inbound traffic from the internet.**
4. **Can EC2 instances in different regions communicate with each other?**
   * 1. **Not directly. You would need to use services like VPC Peering, Transit Gateway, or set up VPNs. EFS is regional and won't work across regions.**
5. **What is the purpose of the Internet Gateway in AWS?**
   1. **An Internet Gateway enables instances in a VPC to access the internet. It’s essential for routing outbound traffic from instances with public IPs.**
6. **What is the role of a Network Interface in EC2?**
   1. **A Network Interface (ENI) is a virtual network card for an instance. It provides a way for instances to communicate within a VPC or over the internet.**
7. **Can you associate an Elastic IP with an EC2 instance? If so, how?**
   1. **You can create an Elastic IP in the VPC dashboard and associate it with an instance to provide a static public IP.**
8. **What is the difference between a Public IP and an Elastic IP in AWS?**
   * 1. **Public IP: Dynamic, assigned on launch, and lost on stopping or terminating the instance.**
     2. **Elastic IP: Static, persistent across stops/restarts, and can be reassigned to another instance.**
9. **How does a Bastion Host help in securing access to EC2 instances?**
   1. **A Bastion Host is a highly secured instance used as a gateway to access private instances in a VPC. It allows SSH or RDP access while preventing direct public access to private instances.**
10. **What is the purpose of a route table in a VPC?**
    1. **A route table controls how traffic is directed within a VPC. It defines routes for instances to communicate with each other, with other subnets, or the internet.**
11. **What are the differences between a public subnet and a private subnet in a VPC?**
    1. **Public Subnet: Subnet that has a route to the Internet via an Internet Gateway. Instances in a public subnet can have public IP addresses and communicate directly with the internet.**
    2. **Private Subnet: Subnet that does not have a route to the Internet. Instances in this subnet do not have direct internet access, but they can access the internet through a NAT Gateway/Instance.**
12. **Can an EC2 instance have multiple ENIs? Why would you need this?  
     Yes, an EC2 instance can have multiple Elastic Network Interfaces (ENIs). Multiple ENIs are used to segregate traffic, have separate security groups, or for connecting to different subnets. This is useful in scenarios where the instance needs to serve different roles, like having public and private interfaces.**
13. **How do you secure communication between an EC2 instance and a database instance in a private subnet?**
    1. **Use Security Groups to allow only specific traffic from EC2 to the database instance.**
    2. **Configure Network ACLs to control the flow of traffic at the subnet level.**
    3. **Ensure the EC2 instance and database instance are in the same VPC or peered VPCs, and communication is done over private IP addresses.**
14. **What are VPC Endpoints, and how do they enhance EC2 instance security?  
    VPC Endpoints allow private connectivity between your VPC and AWS services without using public IPs or going through the internet. They improve security by keeping traffic within the AWS network.**
15. **Can you launch an EC2 instance without assigning a public IP?**
    1. **Explanation: Correct! EC2 instances can be launched without a public IP, especially in private subnets where they don’t need direct internet access.**
16. **What is the purpose of an Elastic IP?**
    1. **Correct Answer: Elastic IP is a static, public IPv4 address that is associated with your AWS account. It can be remapped to any EC2 instance in your account. It's primarily used when you need a fixed public IP that doesn’t change, even if you stop and start the instance.**
    2. **Explanation: Elastic IPs help ensure your instances maintain a consistent public IP address, useful for applications that require fixed addresses.**
17. **Can an EC2 instance be part of multiple subnets?**
    1. **Explanation: You’re on the right track! An EC2 instance can have multiple network interfaces (ENIs), and each ENI can be placed in a different subnet. The instance itself can thus have interfaces in multiple subnets across availability zones.**
18. **How does a Security Group differ from a Network ACL?**
    1. **Correct Answer: Security Groups are stateful firewalls that control inbound and outbound traffic at the instance level. Network ACLs are stateless firewalls that control traffic at the subnet level. Security groups allow you to define which traffic is allowed to reach your instance, while Network ACLs provide an additional layer of control at the subnet level.**
    2. **Explanation: Security groups apply rules to individual instances, while Network ACLs apply rules to subnets, and they differ in whether they are stateful or stateless.**
19. **What is the role of an ENI (Elastic Network Interface)?**
    1. **Explanation: Correct! An Elastic Network Interface (ENI) is a virtual network interface that can be attached to an EC2 instance. It allows the instance to have multiple IP addresses, both public and private. It also allows for network traffic management and supports features like load balancing and failover.**