1. **What is Amazon EC2?**
   * Amazon EC2 (Elastic Compute Cloud) is a web service that provides resizable compute capacity in the cloud. It allows you to run virtual servers, known as instances, on-demand.
2. **Explain the different instance types available in EC2.**
   * EC2 instances come in various types optimized for different use cases. These include General Purpose, Compute Optimized, Memory Optimized, Storage Optimized, and GPU instances.
3. **How is an EC2 instance billed?**
   * EC2 instances are billed per hour, and the cost depends on the instance type, region, and any additional features or options like Reserved Instances or Spot Instances.
4. **What is an Amazon Machine Image (AMI)?**
   * An AMI is a pre-configured template that contains the necessary information to launch an EC2 instance. It includes the operating system, application server, and applications.
5. **How does EC2 differ from traditional hosting?**
   * EC2 provides on-demand, scalable computing capacity in the cloud without the need to invest in physical hardware. Traditional hosting requires purchasing and maintaining physical servers.
6. **What is the significance of an EC2 key pair?**
   * An EC2 key pair consists of a public key to access the instance and a private key for secure communication. It's crucial for securely connecting to your EC2 instance.
7. **Explain the concept of an Elastic IP address.**
   * An Elastic IP is a static IPv4 address designed for dynamic cloud computing. It allows you to maintain a consistent IP address for your EC2 instance, even if it is stopped and started.
8. **What is the purpose of security groups in EC2?**
   * Security groups act as virtual firewalls for your instances. They control inbound and outbound traffic, specifying which protocols and ports are allowed.
9. **How do you launch an EC2 instance?**
   * To launch an EC2 instance, you need to choose an AMI, select an instance type, configure instance details (like network and security groups), add storage, and then review and launch the instance.
10. **What is an EC2 instance profile?**
    * An EC2 instance profile is a container for an IAM role that you can use to pass role information to an EC2 instance when the instance starts.
11. **What is the difference between on-demand instances and reserved instances?**
    * On-demand instances are pay-as-you-go with no upfront commitment, while reserved instances involve a one-time payment for a discount on hourly rates with a commitment for a term (1 or 3 years).
12. **Explain the concept of instance metadata.**
    * Instance metadata provides information about an EC2 instance, such as instance type, public IP, and security group settings. It's accessible from within the instance for dynamic configuration.
13. **How can you enhance the security of your EC2 instances?**
    * You can enhance security by using security groups, key pairs, and IAM roles. Regularly updating and patching your instances also helps.
14. **What is an EC2 placement group?**
    * A placement group is a logical grouping of instances within a single Availability Zone. It can improve network performance or provide fault tolerance.
15. **How does auto-scaling work in EC2?**
    * Auto Scaling automatically adjusts the number of EC2 instances based on defined policies. It ensures optimal performance, availability, and cost efficiency.
16. **Explain the difference between instance store and Amazon EBS-backed instances.**
    * Instance store-backed instances use temporary, block-level storage that is lost when the instance is stopped. EBS-backed instances use persistent storage that persists even if the instance is stopped.
17. **What is Amazon Elastic Block Store (EBS)?**
    * EBS provides scalable block storage volumes that you can attach to EC2 instances. It allows for data persistence beyond the life of the instance.
18. **How can you encrypt an Amazon EBS volume?**
    * You can enable encryption when creating a new EBS volume, or you can encrypt an existing volume using AWS Key Management Service (KMS).
19. **What is EC2 instance tenancy, and what are its types?**
    * Instance tenancy defines where your EC2 instance runs. Types include default (shared hardware), dedicated instances (your instances on dedicated hardware), and dedicated hosts (your instances on a dedicated server).
20. **Explain the use of user data in EC2 instances.**
    * User data allows you to run scripts during instance launch. It's often used for tasks like installing software or configuring settings.
21. **How can you troubleshoot connectivity issues with an EC2 instance?**
    * Check security groups, network ACLs, and route tables. Ensure the instance has a public IP or Elastic IP for internet access.
22. **What is the significance of the EC2 launch wizard?**
    * The EC2 launch wizard is a tool that simplifies the process of launching instances for common use cases, such as Windows or SQL Server.
23. **How does Amazon EC2 handle hardware failure?**
    * EC2 automatically moves instances to new hardware if hardware failure is detected. Features like Auto Scaling also help maintain application availability.
24. **Explain the concept of EC2 instance states.**
    * EC2 instances have different states like pending, running, stopping, and terminated, indicating their current status in the lifecycle.
25. **What is the purpose of the EC2 Systems Manager (SSM)?**
    * EC2 Systems Manager helps manage and configure instances at scale, providing features like Run Command, State Manager, and Automation.
26. **How can you transfer files to/from an EC2 instance?**
    * You can use secure file transfer protocols like SCP, SFTP, or tools like AWS S3, AWS Transfer Family, or AWS Systems Manager.
27. **What is the AWS CLI, and how can it be used with EC2?**
    * The AWS Command Line Interface (CLI) is a tool for interacting with AWS services. You can use it to manage EC2 instances, security groups, and other resources.
28. **Explain the difference between an AMI and a snapshot.**
    * An AMI is a pre-configured image for launching EC2 instances, while a snapshot is a point-in-time copy of an Amazon EBS volume used for backup and replication.
29. **What is an EC2 Fleet?**
    * An EC2 Fleet is a set of capacity options and instance types you define to launch multiple EC2 instances with desired configurations.
30. **How can you change the instance type of a running EC2 instance?**
    * You cannot directly change the instance type of a running instance. You need to stop the instance, change the instance type, and then start the instance again.
31. **Explain the concept of EC2 Spot Instances.**
    * Spot Instances allow you to bid for unused EC2 capacity, providing cost savings compared to on-demand instances. They are suitable for fault-tolerant and flexible applications.
32. **What is the significance of the EC2 instance metadata service?**
    * The instance metadata service provides information about an instance, enabling dynamic configuration. It's accessible within the instance using a metadata URL.
33. **How can you add additional storage to an EC2 instance?**
    * You can add additional storage by attaching new EBS volumes to your instance, or you can resize an existing volume to increase its storage capacity.
34. **What is Amazon EC2 Auto Scaling?**
    * EC2 Auto Scaling automatically adjusts the number of EC2 instances in a group based on policies, ensuring scalability and availability.
35. **How does the EC2 Network Load Balancer (NLB) differ from the Application Load Balancer (ALB)?**
    * NLB operates at the TCP/UDP protocol level, while ALB operates at the application layer, supporting HTTP/HTTPS protocols. NLB is suitable for TCP-based traffic, while ALB is application-aware.
36. **Explain the Elastic Load Balancer (ELB) service in the context of EC2.**
    * Elastic Load Balancer (ELB) distributes incoming application traffic across multiple EC2 instances to ensure high availability and fault tolerance.
37. **How can you secure data at rest on an EC2 instance?**
    * You can use encrypted Amazon EBS volumes, which provide data encryption at rest. Additionally, you can enable encryption at the file system or application level.
38. **What is the purpose of the EC2 Dedicated Hosts?**
    * Dedicated Hosts allow you to have more control over the placement of EC2 instances by specifying a physical host dedicated to your use.
39. **How does EC2 Spot Fleet work?**
    * Spot Fleet is a collection of Spot Instances and optionally on-demand instances launched on your behalf based on defined criteria, providing flexibility and cost efficiency.
40. **Explain the use of EC2 Reserved Instances.**
    * Reserved Instances involve making an upfront payment for a significant discount on the hourly rate, providing cost savings compared to on-demand instances over a one or three-year term.