**EC2 Basics**

1. **What does EC2 stand for and what service does it provide?**
2. **Can you stop and start an EC2 instance without losing data on the instance?**
3. **What is the main purpose of an EC2 security group?**
4. **How do you monitor the performance of an EC2 instance?**
5. **What are the advantages of using EC2 Auto Scaling?  
   What is the role of the EC2 Dashboard in AWS Management Console?**
6. **Can you recover data from a terminated EC2 instance? Why or why not?**
7. **How can you ensure high availability of an application hosted on EC2?**
8. **What are Amazon Machine Images (AMIs), and how do they differ across regions?**
9. **How does Elastic Load Balancing interact with EC2 instances?**
10. **What are the benefits of running an application on EC2 compared to on-premise servers?**
11. **What happens to the data on an instance store when you stop or terminate an EC2 instance?**
12. **Can you increase the size of an instance store? Why or why not?**
13. **What is the significance of an EC2 key pair, and how is it used?**
14. **What is the difference between stopping and terminating an EC2 instance?**

**Instance Types and Pricing**

1. **What are the different EC2 instance families and their purposes (e.g., General Purpose, Compute Optimized, Memory Optimized)?**
2. **How does AWS billing for EC2 instances work?**
3. **What is the difference between Spot Instances and On-Demand Instances?**
4. **How do Reserved Instances work in EC2 pricing?**
5. **What are EC2 instance pricing models available in AWS (e.g., On-demand, Reserved, Spot)?**
6. **What is the purpose of the 'Spot Fleet' feature in AWS?**
7. **What factors determine the hourly cost of an EC2 instance?**
8. **How do Spot Instances save costs, and what is the risk involved?**
9. **Can you change an EC2 instance type after launching it? If so, how?**
10. **What is the difference between a Dedicated Host and a Dedicated Instance?**
11. **What are Burstable Performance Instances (e.g., T2, T3), and how do they work?**
12. **How can you optimize EC2 costs using Reserved Instances?**
13. **What are Convertible Reserved Instances, and how are they different from Standard Reserved Instances?**
14. **How is pricing different for instances with GPUs (e.g., P3, G5)?**
15. **What happens to Spot Instances when your bid price exceeds the current market price?**

**BASICS**

1. **Can you attach multiple Elastic IPs to a single EC2 instance?**
   * 1. **Correct Answer: No**
     2. **Explanation: An instance can have only one Elastic IP per network interface.**
2. **Does EC2 support both Linux and Windows operating systems?**
   * 1. **Correct Answer: Yes**
     2. **Explanation: EC2 instances support a wide range of Linux distributions and Windows Server versions.**
3. **Can you stop and restart Spot Instances?**
   * 1. **Correct Answer: No**
     2. **Explanation: Spot Instances cannot be stopped and restarted like On-Demand instances; they are terminated when interrupted.**
4. **Is it possible to change the instance type after launching it?**
   * 1. **Correct Answer: Yes**
     2. **Explanation: You can change the instance type by stopping the instance, modifying the type, and then restarting it.**
5. **Does an On-Demand instance require a long-term commitment?**
   * 1. **Correct Answer: No**
     2. **Explanation: On-Demand instances have no long-term commitment and are billed based on usage.**
6. **What does EC2 stand for in AWS?**
   1. **Explanation: Correct! EC2 provides scalable computing capacity in the AWS cloud.**
7. **Can EC2 instances run without a VPC?**
   1. **Explanation: Perfect analogy! Every EC2 instance must run within a VPC for network isolation and control.**
8. **What is the difference between an EC2 instance and an AMI?**
   1. **Explanation: Spot on! An AMI includes the configurations (OS, software, etc.) needed to launch an instance.**
9. **Can you modify the security group of a running instance?**
   1. **Correct Answer: Yes, you can modify the security group of a running instance by associating it with a different security group in the EC2 Management Console or through the CLI.**
   2. **Explanation: While you can’t edit a security group directly, you can associate new or additional security groups to the instance.**
10. **Can you assign multiple private IPs to a single EC2 instance?**
    1. **Correct Answer: Yes, you can assign multiple private IPs to an EC2 instance if it is configured with an Elastic Network Interface (ENI) that supports this.**
    2. **Explanation: Instances can have multiple private IPs if the use case requires, especially for networking scenarios.**
11. **What does EC2 stand for and what service does it provide?**
    * 1. **Elastic Compute Cloud lets you create virtual machines (instances) with customizable configurations. It's a pay-as-you-go model.**
12. **Can you stop and start an EC2 instance without losing data on the instance?**
    * 1. **For EBS-backed instances, you can stop and start without losing data, but data on the instance store will be lost.**
13. **What is the main purpose of an EC2 security group?**
    * 1. **It controls inbound and outbound traffic for your instances. Security groups act as a virtual firewall.**
14. **How do you monitor the performance of an EC2 instance?**
    * 1. **You can use Amazon CloudWatch to monitor metrics like CPU utilization, disk I/O, and network traffic.**
15. **What are the advantages of using EC2 Auto Scaling?**
    1. **It automatically adjusts the number of instances to maintain performance and minimize costs.**
16. **What are the benefits of running an application on EC2 compared to on-premise servers?**
    1. **Reduced infrastructure setup and maintenance costs, scalability, customizable virtual machines, and pay-as-you-go pricing are key benefits.**
17. **What happens to the data on an instance store when you stop or terminate an EC2 instance?**
    1. **Data in instance store is ephemeral and lost when stopped or terminated. If the instance is EBS-backed, the data in the EBS volume is retained.**
18. **Can you increase the size of an instance store? Why or why not?**
    1. **No, you cannot. Instance store volumes are fixed in size and tied to the hardware of the instance. You'd need to attach additional EBS volumes for more storage.**
19. **What is the significance of an EC2 key pair, and how is it used?**
    1. **An EC2 key pair is used for secure SSH access to your instances. It ensures secure login without exposing passwords.**
20. **What is the difference between stopping and terminating an EC2 instance?**
    1. **Stopping halts the instance temporarily, retaining the instance configuration and EBS data. Terminating deletes the instance and its associated data (except preserved EBS volumes).**
21. **What is the role of the EC2 Dashboard in AWS Management Console?**
    1. **The EC2 Dashboard in AWS Management Console provides a centralized interface for managing EC2 instances and related resources. It displays an overview of the EC2 instances running in your account, showing information such as instance state, type, public IP, private IP, security group, and associated key pairs. It also offers quick links to launch new instances, configure security settings, view logs, monitor performance metrics, and manage other EC2 resources (like volumes, key pairs, and snapshots).**

**22. Can you recover data from a terminated EC2 instance? Why or why not?**

* 1. **No, you cannot recover data from a terminated EC2 instance. Once an EC2 instance is terminated, its instance store data (ephemeral storage) is lost permanently. However, if you have an EBS (Elastic Block Store) volume attached to the instance, the data on that volume is persistent and can be detached and reattached to another instance. You can also create backups of your EBS volumes (using snapshots) to ensure data recovery in the future.**

**23. How can you ensure high availability of an application hosted on EC2?**

* 1. **To ensure high availability of an application hosted on EC2, you can take several steps:**
  2. **Use Auto Scaling: Automatically scale the number of instances based on demand, ensuring sufficient capacity during traffic spikes.**
  3. **Distribute across multiple Availability Zones (AZs): Deploy EC2 instances across different AZs to protect against data center failures.**
  4. **Use Elastic Load Balancer (ELB): Distribute incoming traffic evenly across multiple EC2 instances to ensure fault tolerance.**
  5. **Use Amazon Route 53 for DNS failover: Route traffic to healthy instances and redirect traffic in case of failures.**

**24. What are Amazon Machine Images (AMIs), and how do they differ across regions?**

* 1. **Amazon Machine Images (AMIs) are pre-configured virtual machine images containing the necessary operating system and software to launch EC2 instances. An AMI includes the operating system, application server, application, and necessary configurations. AMIs differ across regions because they are region-specific. While you can create AMIs from one region and copy them to another, they are not automatically available across different AWS regions. AMIs can be customized to suit specific needs, and their availability in other regions depends on whether they are manually copied or shared.**

**25. How does Elastic Load Balancing interact with EC2 instances?**

* 1. **Elastic Load Balancing (ELB) automatically distributes incoming traffic across multiple EC2 instances to ensure that no single instance is overwhelmed. ELB improves application fault tolerance by ensuring traffic is routed only to healthy instances. ELB supports three types of load balancers:**
  2. **Application Load Balancer (ALB): Best for HTTP/HTTPS traffic, it routes traffic based on URL paths or hostnames.**
  3. **Network Load Balancer (NLB): Best for TCP traffic, it can handle millions of requests per second.**
  4. **Classic Load Balancer (CLB): Older option, supporting both HTTP/HTTPS and TCP.**
  5. **By connecting EC2 instances to an ELB, you ensure even distribution of traffic, which can scale automatically and replace unhealthy instances with healthy ones.**

**26. What is the role of the EC2 Dashboard in AWS Management Console?**

**The EC2 Dashboard provides an overview of all EC2 instances and related resources in your AWS account. It allows you to manage and monitor EC2 instances, view instance details (such as instance state, IP addresses, and tags), launch new instances, configure security groups, and view performance metrics. The dashboard also shows health and status updates for running instances, making it easier to manage your EC2 environment.**

**27. Can you recover data from a terminated EC2 instance? Why or why not?**

**No, you cannot recover data from a terminated EC2 instance. When an EC2 instance is terminated, the associated instance store data is deleted permanently, as it was never backed up to persistent storage. However, if the instance was using EBS (Elastic Block Store) volumes for storage, the data on the attached EBS volumes can be retained separately. But, for instance store-backed instances, data cannot be recovered after termination.**

**28. How can you ensure high availability of an application hosted on EC2?  
To ensure high availability, you can launch EC2 instances in multiple Availability Zones (AZs) within the same region. Use Elastic Load Balancing (ELB) to distribute traffic among these instances, and enable Auto Scaling to automatically add or remove instances based on demand.**

**Instance Types and Pricing**

1. **Name two general-purpose EC2 instance types.**
   1. **Correct Answer: t2.micro & t3.micro (t3.macro isn't a valid instance type).**
   2. **Explanation: The general-purpose instance types, like t2.micro and t3.micro, offer a balance of compute, memory, and networking resources.**
2. **Which instance type is best suited for machine learning workloads?**
   1. **Correct Answer: p3 or p4 (for deep learning), and g4dn (for ML inference).**
   2. **Explanation: EC2 p3 and p4 instances are specifically designed for machine learning, particularly for training complex models, while g4dn instances are great for machine learning inference tasks.**
3. **What are Spot Instances, and when should you use them?**
   1. **Correct Answer: Spot Instances allow you to bid for unused EC2 capacity at a lower price but can be interrupted by AWS with little notice. They are best for flexible, fault-tolerant workloads like batch processing, data analysis, or background jobs.**
   2. **Explanation: Spot Instances offer cost savings but are best used for workloads that can tolerate interruptions.**
4. **Can Reserved Instances be transferred across regions?**
   1. **Explanation: Correct! Reserved Instances are tied to a specific region and cannot be transferred across regions. However, you can modify them within the same region.**
5. **How does Savings Plan differ from Reserved Instances?**
   1. **Correct Answer: Savings Plans offer flexible pricing for EC2, Lambda, and other AWS services, while Reserved Instances are more specific to EC2 instances. Savings Plans allow you to switch instance families, sizes, and regions, while Reserved Instances are more rigid.**
   2. **Explanation: Savings Plans provide more flexibility compared to Reserved Instances. They can apply to multiple instance types, regions, and even services like Lambda, whereas Reserved Instances are specific to EC2 and region.**
6. **What are the different EC2 instance families and their purposes?**
   1. **Examples:**
   2. **General Purpose (e.g., t3, m5): Balanced resources.**
   3. **Compute Optimized (e.g., c5): High-performance processing.**
   4. **Memory Optimized (e.g., r5): For memory-intensive workloads.**
   5. **Storage Optimized (e.g., i3): High disk throughput.**
7. **How does AWS billing for EC2 instances work?**
   1. **Correct! Billing is based on instance uptime, type, and region. Charges apply after free tier limits.**
8. **What is the difference between Spot Instances and On-Demand Instances?**
   1. **Spot Instances: Up to 90% cheaper, but can be interrupted.**
   2. **On-Demand Instances: Pay-as-you-go, no interruptions.**
9. **How do Reserved Instances work in EC2 pricing?**
   1. **You commit to 1 or 3 years, reducing costs significantly. Ideal for predictable workloads.**
10. **What are EC2 instance pricing models available in AWS?**
    1. **On-demand, Reserved, Spot, and Dedicated Hosts/Instances.**
11. **What is the purpose of the 'Spot Fleet' feature in AWS?**
    1. **A Spot Fleet allows you to manage a collection of Spot Instances and On-Demand Instances to optimize costs and meet capacity needs.**
12. **What factors determine the hourly cost of an EC2 instance?**
    1. **Factors include:**
    2. **Instance type (e.g., t2.micro, m5.large).**
    3. **Region.**
    4. **Pricing model (On-demand, Reserved, Spot).**
    5. **Storage and additional services like Elastic IP or data transfer.**
13. **How do Spot Instances save costs, and what is the risk involved?**
    1. **Correct! Spot Instances are highly cost-effective (up to 90% cheaper) but can be terminated by AWS when the market price exceeds your bid price or capacity is unavailable.**
14. **Can you change an EC2 instance type after launching it? If so, how?**
    1. **Yes, by stopping the instance, modifying its instance type, and then restarting it. This is done in the EC2 dashboard under "Instance Settings."**
15. **What is the difference between a Dedicated Host and a Dedicated Instance?**
    1. **Dedicated Host: Gives complete control over physical servers, allowing compliance with licensing requirements.**
    2. **Dedicated Instance: Runs on isolated hardware, but no control over the physical server.**
16. **What are Burstable Performance Instances (e.g., T2, T3), and how do they work?  
    Burstable Performance Instances provide baseline performance with the ability to burst to a higher performance level when needed. These instances accumulate "CPU credits" during low utilization, which can be used to burst when higher CPU performance is required. T2 and T3 are popular families.**
17. **How can you optimize EC2 costs using Reserved Instances?  
    Reserved Instances provide a discount compared to On-Demand instances in exchange for committing to use a specific instance type in a specific region for a 1- or 3-year term. You can optimize costs by purchasing Reserved Instances when you have predictable workloads.**
18. **What are Convertible Reserved Instances, and how are they different from Standard Reserved Instances?  
    Convertible Reserved Instances allow you to change the instance type, operating system, or tenancy during the reservation period. Standard Reserved Instances, on the other hand, are fixed for the duration of the term.**
19. **How is pricing different for instances with GPUs (e.g., P3, G5)?  
    Instances with GPUs (e.g., P3, G5) are priced higher than regular EC2 instances because they provide specialized hardware designed for compute-intensive tasks like machine learning and high-performance computing.**
20. **What happens to Spot Instances when your bid price exceeds the current market price?  
    When your bid price exceeds the current market price, the Spot Instance will continue running as long as there is available capacity. However, if the market price exceeds your bid or if AWS needs the capacity, the instance may be terminated.**