1. Define what cloud computing is with one sentence.  
   CC is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user.
2. Pricing model  
   “Pay-as-you-go” – helps reduce capital expenses but also lead to unexpected operating expenses for unaware users.
3. Difference between distributed computing and cloud computing  
   - DC studies distributed systems – a system whose components (nodes) are located on different networked computers. Workload is divided across multiple systems to optimize processing speed, availability, and fault tolerance.  
   - CC is a service model that provides on-demand access to a shared pool of computing resources (servers, storage, application, etc.) over the internet.
4. List the deployment models  
   Types of access to the CC:  
   - Public Cloud (AWS, Azure) – share resources with other organizations or cloud tenants – provide services through the web – service categories: Compute, Data Storage, Platform, Application, Network  
   - Private Cloud – resources used exclusively by one business or organization  
   - Hybrid Cloud
5. What is CDN  
   Content Delivery (or Distribution) Network – geographically distributed network of proxy servers and their data centers. The goal is to provide high availability and performance by distributing the service spatially relative to the users.
6. List the service models and the services in each model

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| --- | --- |
| Software as a Service (SaaS)   * Applications, services | Infrastructure as a Service (IaaS)   * Networks, physical computer systems, VMs, block data storage, VPNs, EC2 |
| Platform as a Service (PaaS)   * Run time environment for applications (i.e., OS, object storage, databases) * Software development environment, APIs | Serverless Computing   * Function as a Service (FaaS) – Lambda, API gateways * Backend as a Service (BaaS) – DB management, user auth, push notifications, hosting * In between PaaS and SaaS |

1. Advantages and disadvantages of CC

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| --- | --- |
| * Up/down scalability * Load balancing, multiple geographic access points * Easy development and deployment * No physical maintenance by tenants * No direct interaction with cloud service providers * Cost effective by pay-per-use * Security (backups and fault tolerance) | * Security risks (data loss, theft, DoS attack) * Privacy risks (sensitive information leakage, ownership of data) * Speed of internet connection * It is not easy to switch to another service provider |

1. Challenges faced by tenants  
   - Scalability, how to get more or how to use less (horizontal/vertical)  
   - Physical location, which distributed data center to use?  
   - Data deletion, is data actually deleted and how to verify if it is?  
   - Administrator access
2. What is VM? What is a hypervisor?   
   - VM is the virtualization/emulation of a computer system – they are based on computer architectures and provide functionality of a physical computer.  
   - Hypervisors are computer software, firmware or hardware that allows partitioning the resources of a CPU among multiple OSs or independent programs.   
   Two types: 1) Over computer hardware (full virtualization) and 2) Over host OS
3. Advantages and disadvantages of VM

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| --- | --- |
| * Visually, each VM image looks like a data folder * VMs can be moved and copied * Centralized workloads * Run different OSs without increasing overhead * Update apps and the OS without affecting the end-user experience * No or less physical management | * VMs require significant RAM and CPU users * The software development life cycle is more complex with VMs * Moving VMs between public clouds, private clouds and traditional data centers can be challenging |

1. What is VPC?  
   Virtual Private Cloud – like a VPN built in a cloud – multiple virtual machines in cloud. They can be housed in multiple zones and regions.
2. Difference between VM and container  
   - VMs enable you to run multiple OS on the hardware of a single physical server.  
   - Containers enables you to deploy multiple applications using the same OS on a single VM/server.
3. What are AWS IAM, EC2, EBS, S3?  
   - IAM (Identity and Access Management) – Used for managing access to AWS services and resources. Allows you to create and manage users, groups, roles, and permissions.  
   - EC2 (Elastic Compute Cloud) – Provides resizable compute capacity in the cloud, offering virtual servers (instances) to run applications  
   - EBS (Elastic Block Storage) – Provides block-level storage that can be attached to EC2 instances, allowing for data persistence beyond the lifetime of an instance  
   - S3 (Simple Storage Service) – An object storage service for storing and retrieving any amount of data, with a simple web services interface.
4. Difference between AWS root user and administrator user  
   The AWS root user has unrestricted, permanent access to all account resources, while an administrator user has managed permissions granted through IAM policies.
5. How are user-based policies and resource-based policies used?  
   User-based policies attach permissions to IAM users, groups, or roles to control what actions they can perform on AWS resources, while resource-based policies are attached directly to resources (like S3 buckets) to specify who can access them and what actions they can perform.
6. Three ways to access AWS CC  
   - Web Console: AWS Management Console through a web browser   
   - AWS CLI  
   - AWS SDKs and APIs
7. Key pairs and security groups when EC2 servers are used  
   - Key pairs consist of public and private key, used for secure SSH access to an EC2 instance  
   - Security groups act as virtual firewalls that control inbound and outbound traffic to EC2 instances
8. What kind of service is S3?  
   S3 (Simple Storage Service) is an object storage service that provides scalable, high-durability, and low-latency storage for storing and retrieving any amount of data (files, backups, multimedia, etc.)
9. How are bucket, folder, object, and key different?  
   - Bucket: Container that stores objects (files) in S3. Each bucket has a unique name across all of AWS and serves as the top-level namespace for organizing data.  
   - Folder: A logical grouping within a bucket, used to organize objects in a hierarchy similar to a file system.  
   - Object: Storage unit in S3, consisting of the data itself (file content) and associated metadata. Objects are stored inside buckets.  
   - Key: Unique identifier for an object within a bucket
10. How to use Promise

let echoPromise = (message) => {

            return new Promise((resolve) => {

                $.get("server\_echo.php", {

                    message: message

                }, (response) => {

                    resolve(response);

                });

            });

        };

$("#echo-promise").click(() => {

            let msg = $("#msg").val();

            echoPromise(msg).then((result) => {

                $("#echoed-message").text(result);

            });

        });

1. How to use Async & Await

let echoAsyncAwait = async (message) => {

            return new Promise((resolve) => {

                $.get("server\_echo.php", {

                    message: message

                }, (response) => {

                    resolve(response);

                });

            });

        };

$("#echo-async-await").click(async () => {

            let msg = $("#msg").val();

            let result = await echoAsyncAwait(msg);

            $("#echoed-message").text(result);

        });