**What is AWS?**

* Aws is cloud computing services provided by amazon**,** offers a wide range of on-demand computing services, such a storage, database, n/w, machine learning and security.
* It allows business and individuals to store data, host apps and run workloads without managing the physical hardware.

**What are the key benefits of using AWS?**

* Scalability: Easily scale up / down the resources according to the need.
* Pay-as-you-go: You only pay for what you use.
* Security: Provides robust security with firewalls, encryption and compliance standards.
* Global Infrastructure: AWS has data centers worldwide, ensuring low latency and high availability.
* Automation: Services like Lambda, helps to run the code without managing the servers.

**What is the difference between AWS Regions and Availability Zones?**

* AWS Region: is a geographical area that contains more Availability Zones.
  + Each region is isolated and operates independently.
  + A region has at least 3-availability zones.
  + Data replication has not happen automatically.
* Aws Availability: is a datacenter within a region.
  + Can be automatic within a region
  + High availability, redundancy

**What is EC2? What are its different pricing models?**

* EC2 is a cloud based virtual server that provides virtual scaling power for running applications, hosting websites and handling workloads.

| Pricing Models | Cost efficiency | Commitment | Best for |
| --- | --- | --- | --- |
| On - Demand | High | No | Short-term workloads, testing |
| Reserved | Upto 75% discount | 1-3 years | Predictable workloads, always-on apps |
| Spot | Upto 90% discount | No | AI, Big Data, Batch Processing |
| Saving plans | Upto 66% | 1-3 | Flexible,cost saving |
| Dedicated | Expensive | 1-3 | Compliance, licensing requirements |

**What is S3? How is it different from EBS?**

| Feature | Amazon S3 | EBS |
| --- | --- | --- |
| Storage Type | Object Storage | Block Storage |
| Use Case | File storage, Backups, Media storage | High performance for EC2 |
| Scalability | Virtually Unlimites | Limited to 16TiB per volume |
| Access | Accessible via internet | Attacthed to single EC2 |
| Performance | High latency but good for file storage | Low latency, high IOPS |
| Data persistence | Persistent, independent of compute | Persistent but tied to EC2 instances |
| Durability | High | High availbility |
| Cost model | Pay per GB stored + data transfer costs | Pay for provisioned capacity |

**What are IAM roles, users, and policies?**

* **IAM Roles:**
  + An IAM Role is an AWS identity that assumes permissions temporarily.
  + No username/ password
  + Temporary access credentials generated temporarily
* **IAM Users:**
  + It is an individual AWs identity with specific permissions.
  + Represents a single person/ application
  + Has credentials.
  + Can be assigned permissions via policies
* **IAM Policies:**
  + IAM policies defines the permissions for users, groups and roles.
  + Written in JSON format.
  + Attach to users, roles, or groups.
  + Define what actions are allowed or denied on AWS resources.

**What is an Elastic Load Balancer (ELB), and why is it used?**

* Elastic Load Balancer (ELB): An ELB is an AWS service that automatically distributes incoming traffic across multiple instances, containers or IP addresses to improve application availability, scalability, and fault tolerance.
  + High availability: Ensures that no single server is overloaded.
  + Scalability: Automatically adjusts to traffic changes
  + Fault Tolerance: Redirects traffic away from unhealthy instances.
  + Security: Supports SSLS/TLS termination, WAF termination.
  + Flexible Routing: Directs traffic based on application layer (HTTP/HTTPS) or network layer (TCP/UDP) rules.

**What is the difference between a Public and Private Subnet in AWS?**

* AWS subnets are subdivisions of VPC that help to organize and control network.
* A Public Subnet allows direct access from the internet, while a subnet is isolated and only accessible via internal networking.

| Fature | Public Subnet | Private Subnet |
| --- | --- | --- |
| Internet Access | Yes | No |
| Public Ip | Required | Not Required |
| Use Case | WebServers, Load Balancers and API’s | Databases, Application Servers |
| Route Table | Has Route to IGW | Routes traffic to NAT Gateway or Private Network |
| Security | More exposed to public | Highly secure, internal access only |

**What is the difference between RDS and DynamoDB?**

| Feature | Amazon RDS | DynamoDB |
| --- | --- | --- |
| Database Type | Relational | No SQL |
| Schema | Fixed Schema | Schema less |
| Language | SQL | NoSQL |
| Scalability | Vertical | Horizantal |
| Performance | Moderate | High-Speed |
| Consistency | Strong | Eventual |
| Availability | Multi-AZ failover, backups | Multi-region replication |
| Use Case | Financial systems, ERPs, CRM | Gaming, IoT, real-time apps, serverless |

**Explain the concept of VPC. What are its key components?**

* Amazon VPC is a secure, isolated network environment within AWS that allows you to launch AWS resources in a logically defined private space.
* It functions like a virtual data centers on AWS.
* Key Components:
  + Subnets: Subnet is a small network inside a VPC, dividing the IP range.
  + Public Subnet connected to the internet via an IGW.
  + Private Subnet no direct internet access, used for databases / backend services.
  + Internet GateWay: An Internet Gateway allows resources in a public subnet to access the internet.
  + Required for public - facing servers.
  + NAT Gateway: enables instances in a private subnet to access the internet outbound without exposing them to incoming traffic.
  + Used when private instances need to download security patches or updates.
  + Route Tables: controls how network flows within a VPC.
  + Routes traffic between subnets, internet, VPNs and peered VPCs.
  + Security Groups and N/W ACLs:
  + SGs: Firewall rules at the instance level.
  + N/W ACLs: Firewall rules at the subnet level.
  + VPC Peering: VPC peering allows VPCs to communicate securely using Public IPs.
  + Used for connecting different VPCc across AWS accounts.

**What is the difference between Security Groups and NACLs?**

| Feature | Security Groups | NACLs |
| --- | --- | --- |
| Level | Instance Level | Subnet Level |
| Statefulness | Stateful | Stateless |
| Rules | Only Allow rules | Either Allow and Deny rules |
| Default Behaviour | All Inbound/ Outbound traffic is denied by default | All Inbound/ Outbound traffic is by default |
| Rule Evaluation | All rules apply at once | Rules are processed in orde (lowest first) |
| Use Case | Control access to specific instances | Control access for entire subnets |
| Best for | EC2 security, fine grained access | Blocking specific IPs, subnet-level control |

**What is an Amazon SNS and SQS? How do they differ?**

| Feature | Amazon SNS | Amazon SQS |
| --- | --- | --- |
| Messaging Model | Publish - Subscribe | Message Queue |
| Message Delivery | Push based | Pull based |
| Message Retention | Not stored | Stored upto 14 days |
| Use Case | Notifications, real-time updates | Processing workloads asynchronous |
| Message Order | No message order | Fifo option ensures order |
| Best for | Alerts | Task processing |

**Explain the concept of AWS Lambda and its advantages?**

* AWS Lambda is a serverless computing services that lets you run code without provisioning or managing servers.
* It automatically scales and executes code only when needed, charging only for the compute time used.
* Advantages:
  + No Server Management
  + Pay - per - use
  + AutoScaling
  + Event Driven Execution
  + High Availability
  + Supports Multiple Languages
  + Integrates with AWS Ecosystem

**What is the difference between Amazon ECS and EKS?**