**What is AWS?**

Amazon Web Services (AWS) is a cloud computing platform offering a vast array of services. To navigate AWS efficiently, start with the AWS Management Console. Here, you can create and manage resources such as EC2 instances, S3 buckets, and databases. The AWS CLI (Command Line Interface) is a powerful tool for automating tasks and managing resources from the command line. Utilize IAM (Identity and Access Management) to control user permissions securely. Explore EC2 for scalable virtual servers and S3 for object storage. Leverage AWS Lambda for serverless computing and CloudWatch for monitoring and logging. Remember, AWS offers a free tier, allowing you to experiment with various services at no cost. Keep this cheatsheet handy for quick reference in your AWS journey.

**What is IAAS, PAAS, SAAS?**

Infrastructure as a Service (IaaS) provides fundamental computing resources like virtual machines, storage, and networking. In AWS, EC2 instances and S3 storage exemplify IaaS.

Platform as a Service (PaaS) abstracts more complexity, offering a platform with pre-built components. AWS Elastic Beanstalk is a prime example, allowing developers to focus on code while AWS manages infrastructure details.

Software as a Service (SaaS) delivers fully functional applications over the internet. AWS hosts various SaaS solutions, like Amazon WorkMail and Chime for communication, relieving users from managing underlying infrastructure.

**What is Billing?**

1. Compute Resources: Charges for services like EC2 are incurred based on the type and number of instances used, along with factors like data transfer and storage.
2. Storage: AWS charges for the amount of data stored, with variations depending on the type of storage (e.g., S3, EBS).
3. Data Transfer: Costs are associated with data moving in and out of AWS regions, both within and between services.
4. Additional Services: Charges apply to the usage of additional services like databases, machine learning, and content delivery networks.
5. Support Plans: AWS offers different support plans, each with its associated cost, providing varying levels of assistance.

What is AWS region?

Amazon Web Services (AWS) operates a global network of data centers, organized into geographic regions. Each region is a cluster of data centers designed to provide low-latency access to AWS services. Key points to understand about AWS regions:

1. Geographic Distribution: AWS has multiple regions worldwide, such as us-east-1 (North Virginia), eu-west-1 (Ireland), and ap-southeast-2 (Sydney), allowing users to deploy resources in close proximity to end-users.
2. Availability Zones: Each region is divided into Availability Zones, isolated data centers within the same region. Leveraging multiple availability zones enhances fault tolerance and ensures high availability.
3. Data Residency and Compliance: Users can choose specific regions to comply with data residency requirements and regulations. AWS provides services like AWS Artifact to access compliance reports and certifications.
4. Service Availability: Not all AWS services are available in every region. Users should check the AWS Regional Services List to ensure the availability of desired services in their chosen region.
5. Global Services: Some AWS services, such as S3 and Route 53, are global and not tied to a specific region. These services provide a consistent experience regardless of the chosen region.

What is AWS availbility zone?

AWS Availability Zones (AZs) are isolated data centers within a specific geographic region, each designed to operate independently. Key aspects to consider about Availability Zones:

1. **High Availability:** Deploying resources across multiple Availability Zones enhances fault tolerance and ensures high availability. In the event of a failure in one zone, applications can continue running in other zones without disruption.
2. **Data Center Isolation:** Each Availability Zone is isolated with its power, cooling, and networking infrastructure, reducing the risk of simultaneous failures due to events like power outages or network issues.
3. **Deployment Strategies:** When setting up resources on AWS, distributing them across multiple Availability Zones is a recommended best practice. This can be achieved using services like Elastic Load Balancing (ELB) to distribute incoming traffic.
4. **Localized Failures:** Availability Zones are typically located miles apart and connected by low-latency, high-throughput networking. This minimizes the impact of localized failures such as natural disasters or network outages.
5. **Scalability:** Availability Zones enable scalable and resilient architectures. Auto Scaling groups, for example, can distribute instances across multiple zones, automatically adjusting to demand.

What is Instance?

AWS Instances: Building Blocks of Cloud Computing:

In the realm of Amazon Web Services (AWS), an "instance" refers to a virtual server in the cloud. Key characteristics and considerations:

**Virtual Servers:** Instances are essentially virtual machines running within AWS infrastructure, providing computing power, memory, and storage for various applications.

**Instance Types:** AWS offers a variety of instance types optimized for different use cases. These range from general-purpose instances (e.g., t3.micro) to specialized instances for tasks like machine learning or graphics processing.

**Elasticity:** One of the defining features of instances is their elasticity. Users can easily scale up or down by launching or terminating instances based on application demand, providing flexibility and cost optimization.

**AMI (Amazon Machine Image):** Instances are launched from AMIs, which are pre-configured templates containing the necessary information to launch an instance, including the operating system and other software.

**Security Groups and Networking:** Instances are associated with security groups that control inbound and outbound traffic. Users can configure networking aspects, including IP addresses, and instances can reside within Virtual Private Clouds (VPCs).

**Storage Options:** Instances can have associated storage, such as Amazon Elastic Block Store (EBS) volumes for persistent storage, or they can use instance store volumes for temporary storage.

What is security group?

In AWS, a security group acts as a virtual firewall for instances. It controls inbound and outbound traffic, specifying rules that permit or deny access based on protocols, ports, and IP addresses. Each instance is associated with one or more security groups, adding a layer of network security. Security groups are stateful, meaning if you allow inbound traffic, the corresponding outbound traffic is automatically allowed. Configuring security groups is essential for controlling access to AWS instances and enhancing overall system security.

What is elastic and static IP?

In AWS, an Elastic IP (EIP) is a public IPv4 address that can be dynamically assigned to an AWS instance. It provides a consistent IP address even if the instance is stopped and restarted. This is beneficial for scenarios where a fixed public IP is crucial, like hosting a website.

In contrast, a static IP address typically refers to a fixed IP assigned to a resource, such as an instance. AWS Elastic IPs can be considered a form of static IP, offering flexibility and persistence in addressing cloud resources. Understanding when to use Elastic IPs or rely on dynamic addressing depends on specific requirements, such as maintaining a stable public IP for a server or service.

What is EBS?

Amazon EBS is a scalable block storage service in AWS, providing persistent storage volumes for EC2 instances. Key features:

**Volume Types:** EBS offers various volume types, including General Purpose (SSD), Provisioned IOPS (SSD), and Magnetic (HDD), catering to different performance and cost requirements.

**Snapshots:** EBS volumes can be backed up through snapshots, capturing the volume's state at a specific point in time. Snapshots are essential for data backup, recovery, and migrating volumes across regions.

**Attachment to Instances:** EBS volumes can be attached to EC2 instances, offering durable and low-latency block-level storage. Instances can have multiple volumes attached, each serving different purposes.

**Encryption:** EBS provides options for encrypting volumes at rest, ensuring data security. This is crucial for compliance and data protection requirements.

**Elasticity:** Volumes can be easily resized, and users can modify volume types on-the-fly, offering flexibility in adapting storage configurations to changing workload demands.

What is snapshot?

In Amazon Web Services (AWS), EBS snapshots are point-in-time copies of Elastic Block Store (EBS) volumes. Key aspects:

1. **Backup and Recovery:** Snapshots enable backup and recovery strategies, allowing users to capture the state of EBS volumes at specific moments. This is crucial for data protection and resilience.
2. **Incremental Backups:** EBS snapshots are incremental, meaning only the changes since the last snapshot are stored. This optimizes storage usage and reduces costs.
3. **Cross-Region Copy:** Snapshots can be copied across AWS regions, facilitating data redundancy, disaster recovery, and compliance with data residency requirements.
4. **AMI Creation:** Amazon Machine Images (AMIs), used for EC2 instance launches, can be created from EBS snapshots. This accelerates the process of replicating configurations and applications.
5. **Encryption:** EBS snapshots can be encrypted for enhanced security. This ensures that sensitive data is protected both at rest and during transit.

What is AMI?

In Amazon Web Services (AWS), an Amazon Machine Image (AMI) is a pre-configured template used to create virtual machines. Key features:

1. **Blueprint for Instances:** An AMI serves as a blueprint for launching EC2 instances, encapsulating the root filesystem, software, and configuration settings.
2. **Customization:** Users can create custom AMIs, tailoring instances to specific needs. This is valuable for ensuring consistency and efficiency in deploying applications.
3. **Public and Private AMIs:** AWS provides a repository of public AMIs that users can readily access. Additionally, users can create and share private AMIs within their AWS account.
4. **Lifecycle Management:** AMIs support versioning, allowing users to manage updates and changes over time. This ensures that instances launched from the AMI are consistent and up to date.
5. **Snapshot Basis:** AMIs can be created directly from EBS snapshots, providing a mechanism for capturing and replicating the state of EBS volumes.

What is ELB?

Elastic Load Balancing (ELB) in Amazon Web Services (AWS) is a service that automatically distributes incoming application traffic across multiple targets, such as EC2 instances, enhancing availability and fault tolerance. Key points:

1. **Load Distribution:** ELB evenly distributes incoming traffic to instances within multiple Availability Zones, optimizing resource utilization and improving application performance.
2. **Auto Scaling Integration:** ELB seamlessly integrates with Auto Scaling, automatically adjusting the number of instances based on demand. This ensures that the application scales to meet varying workloads.
3. **Health Monitoring:** ELB regularly checks the health of registered instances and routes traffic only to healthy instances. This enhances the overall reliability and fault tolerance of the application.
4. **SSL Termination:** ELB supports SSL termination, offloading the SSL decryption process from instances, which can improve performance and simplify certificate management.
5. **Application and Network Load Balancers:** AWS offers both Application Load Balancers for HTTP/HTTPS traffic and Network Load Balancers for TCP/UDP traffic. This allows users to choose the appropriate type based on their application needs.