Practical-1 Infrastructure as a service using AWS

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Cloud Computing Architecture

Cloud computing architecture consists of a combination of components, technologies, and services that enable computing resources to be delivered over the internet. It generally includes:

1. **Front-end**: The user interface where clients interact with cloud services. This could be through a web browser, mobile app, or API.
2. **Back-end**: The infrastructure and services that support the front-end, including storage, databases, servers, and networking.
3. **Cloud Resources**: Resources are categorized by service models such as **Infrastructure as a Service (IaaS)**, **Platform as a Service (PaaS)**, and **Software as a Service (SaaS)**. Each model provides a different level of control, flexibility, and resource management.
4. **Network**: The internet serves as the medium connecting the front-end with the back-end, enabling seamless data exchange.
5. **Management and Security**: Security frameworks, governance, and management tools ensure resources are used efficiently and securely.

Infrastructure as a Service (IaaS)

IaaS is a cloud computing service model that provides virtualized physical resources over the internet, such as servers, storage, and networking. In IaaS, customers rent the infrastructure they need instead of purchasing and managing physical hardware. Key characteristics include:

- **Scalability**: Users can increase or decrease resources as needed.
- **Cost-efficiency**: IaaS follows a pay-as-you-go model, which can reduce operational costs.
- **Virtualization**: Resources like servers, storage, and networking are delivered virtually, enhancing flexibility.
- **Full Control**: Users have more control over the underlying infrastructure compared to other models like PaaS and SaaS.

Amazon Web Services (AWS)

Amazon Web Services (AWS) is a comprehensive and widely-used cloud platform by Amazon, offering a variety of services that support IaaS, PaaS, and SaaS models. AWS provides solutions for computing, storage, databases, machine learning, analytics, and more. Key benefits of AWS include:

- **Global Infrastructure**: AWS has data centers around the world, enabling low-latency and high-availability services.
- **Wide Range of Services**: AWS provides over 200 services, including computing, storage, databases, artificial intelligence, and IoT.
- **Reliability and Security**: AWS follows industry-leading security standards and provides numerous tools to protect data and manage compliance.
- **Flexible Pricing**: AWS's pricing model allows users to choose between different billing options, such as on-demand, reserved, and spot instances.

Amazon EC2 (Elastic Compute Cloud)

Amazon Elastic Compute Cloud (EC2) is a core IaaS service within AWS that provides resizable virtual servers in the cloud. EC2 allows users to quickly scale up or down depending on their computing needs. Key features of EC2 include:

- **Elasticity**: EC2 provides on-demand instances and allows users to launch, stop, and configure servers as needed.
- **Instance Types**: EC2 offers a wide range of instance types, allowing users to select the optimal CPU, memory, storage, and networking configurations.
- **Security**: With features like Virtual Private Cloud (VPC) and Security Groups, EC2 enables a high level of control over network access and data protection.
- **Pricing Models**: EC2 supports multiple pricing options, including on-demand, reserved instances, and spot instances, making it cost-effective for various workload needs.