DAY-01 | Cloud Computing | AWS Global Infrastructure | Tour of the AWS Console | AWS Cloud Practitioner Certification CLF-C02

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Cloud Computing

➲ What is Cloud Computing?

Cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the internet (the cloud) to offer faster innovation, flexible resources, and economies of scale. Users typically pay only for the cloud services they use, which helps lower operating costs, run infrastructure more efficiently, and scale as business needs change.

➲ The Deployment Models of the Cloud

Private Cloud:	Public Cloud:	Hybrid Cloud:
Cloud services used by a single organization, not exposed to the public.	Cloud resources owned and operated by a thirdparty cloud service provider delivered over the Internet.	Keep some servers on premises and extend some capabilities to the Cloud
Complete control	Six Advantages of Cloud Computing	Control over sensitive assets in your private infrastructure
Security for sensitive applications		Flexibility and costeffectiveness of the public cloud
Meet specific business needs		

Deployment Models of the Cloud

➲ The Five Characteristics of Cloud Computing

- **On-Demand Self-Service**: Users can provision computing capabilities as needed automatically without requiring human interaction with each service provider.
- **Broad Network Access**: Services are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms.
- **Resource Pooling**: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to demand.
- **Rapid Elasticity**: Capabilities can be elastically provisioned and released to scale rapidly outward and inward commensurate with demand.
- **Measured Service**: Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth).

➲ Six Advantages of Cloud Computing

- **Trade capital expense (CAPEX) for operational expense (OPEX)**

➻ Pay On-Demand: don't own hardware

➻ Reduced Total Cost of Ownership (TCO) & Operational Expense (OPEX)

- **Benefit from massive economies of scale**

➻ Prices are reduced as AWS is more efficient due to large scale

- **Stop guessing capacity**

➻ Scale based on actual measured usage

- **Increase speed and agility**
- **Stop spending money running and maintaining data centers**
- **Go global in minutes**

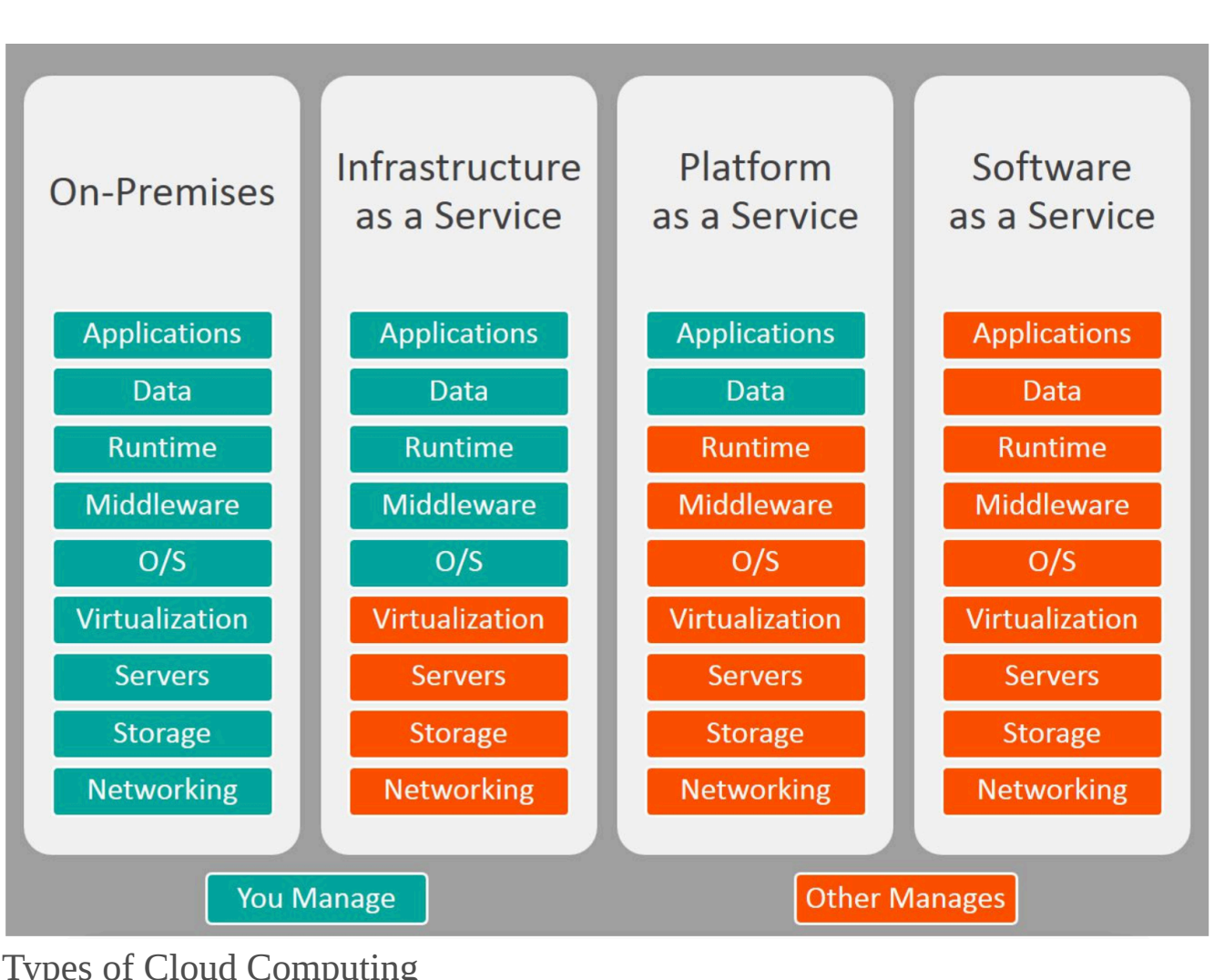
➻ leverage the AWS global infrastructure

➲ Problems solved by the Cloud

- **Flexibility:** change resource types when needed
- **Cost-Effectiveness:** pay as you go, for what you use
- **Scalability:** accommodate larger loads by making hardware stronger or adding additional nodes
- **Elasticity:** ability to scale out and scale-in when needed
- **High-availability and fault-tolerance:** build across data centers
- **Agility:** rapidly develop, test and launch software applications

➲ Types of Cloud Computing with Example

1. **Infrastructure as a Service (IaaS)**: Provides virtualized computing resources over the internet. **Example**: Amazon EC2, Google Compute Engine, Azure, Rackspace, Digital Ocean, Linode
2. **Platform as a Service (PaaS)**: Provides hardware and software tools over the internet. **Example**: AWS Elastic Beanstalk, Google App Engine, Heroku, Windows Azure (Microsoft)
3. **Software as a Service (SaaS)**: Helps Delivers software applications over the internet. **Example**: Google Workspace, Microsoft Office 365, Many AWS services (ex: Rekognition for Machine Learning), Dropbox, Zoom



Types of Cloud Computing

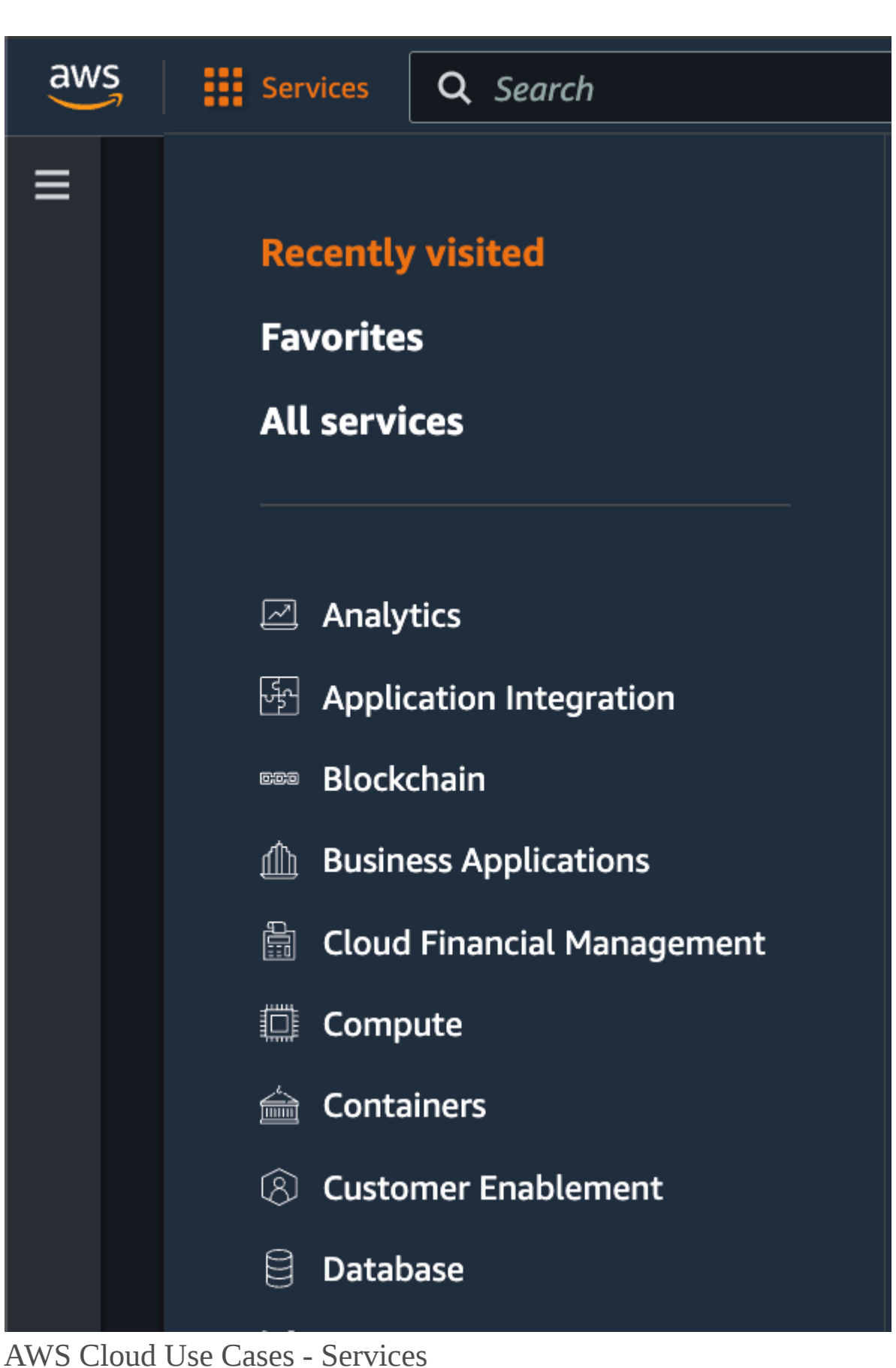
➲ Pricing of the Cloud – Quick Overview

AWS has 3 pricing fundamentals, following the pay-as-you-go pricing model

- **Compute :** Pay for compute time
- **Storage :** Pay for data stored in the Cloud
- **Data transfer OUT of the Cloud :** Data transfer IN is free
- Solves the expensive issue of traditional IT

➲ AWS Cloud Use Cases

- **Web Hosting** : Hosting websites and web applications.
- **Big Data Analytics** : Processing and analyzing large datasets.
- **Storage and Backup** : Storing and backing up data securely.
- **DevOps** : Automating software development processes.
- **Machine Learning** : Building and deploying machine learning models.



AWS Cloud Use Cases - Services

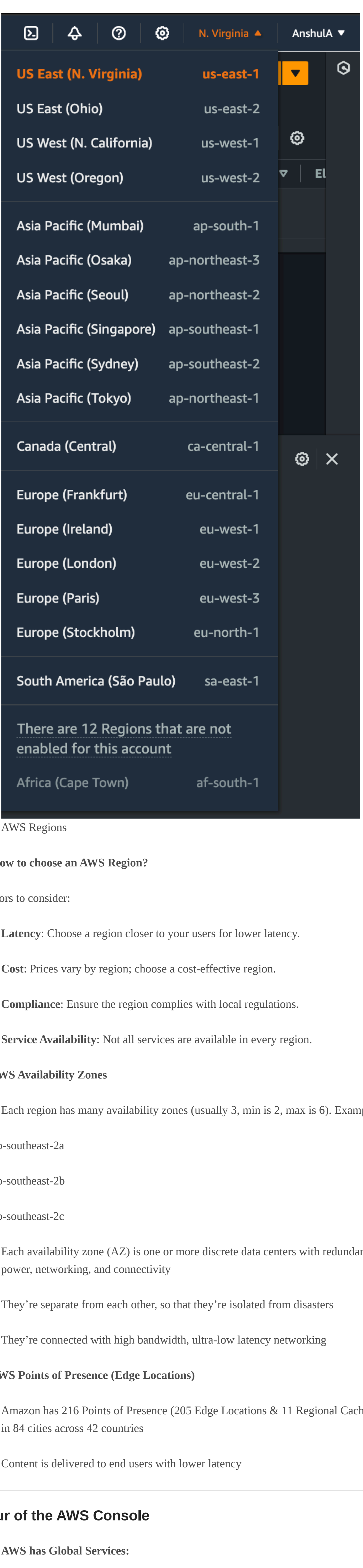
AWS Global Infrastructure

AWS provides a reliable, scalable, and low-cost infrastructure platform in the cloud that powers hundreds of thousands of businesses in 190 countries around the world.

- AWS Regions
- AWS Availability Zones
- AWS Data Centers
- AWS Edge Locations / Points of Presence
- https://infrastructure.aws/

➲ AWS Regions

- AWS has Regions all around the world
- Names can be us-east-1, eu-west-3…
- A region is a **cluster of data centers**
- Most AWS services are region-scoped



AWS Regions

➲ How to choose an AWS Region?

Factors to consider:

- **Latency**: Choose a region closer to your users for lower latency.
- **Cost**: Prices vary by region; choose a cost-effective region.
- **Compliance**: Ensure the region complies with local regulations.
- **Service Availability**: Not all services are available in every region.

➲ AWS Availability Zones

- Each region has many availability zones (usually 3, min is 2, max is 6). Example:

➾ ap-southeast-2a

➾ ap-southeast-2b

➾ ap-southeast-2c

- Each availability zone (AZ) is one or more discrete data centers with redundant power, networking, and connectivity
- They're separate from each other, so that they're isolated from disasters
- They're connected with high bandwidth, ultra-low latency networking

➲ AWS Points of Presence (Edge Locations)

- Amazon has 216 Points of Presence (205 Edge Locations & 11 Regional Caches) in 84 cities across 42 countries
- Content is delivered to end users with lower latency

Tour of the AWS Console

- **AWS has Global Services:**

→ Identity and Access Management (IAM)

→ Route 53 (DNS service)

→ CloudFront (Content Delivery Network)

→ WAF (Web Application Firewall)

- **Most AWS services are Region-scoped:**

→ Amazon EC2 (Infrastructure as a Service)

→ Elastic Beanstalk (Platform as a Service)

→ Lambda (Function as a Service)

→ Rekognition (Software as a Service)

- **Region Table:** https://aws.amazon.com/about-aws/global-infrastructure/regional-product-services

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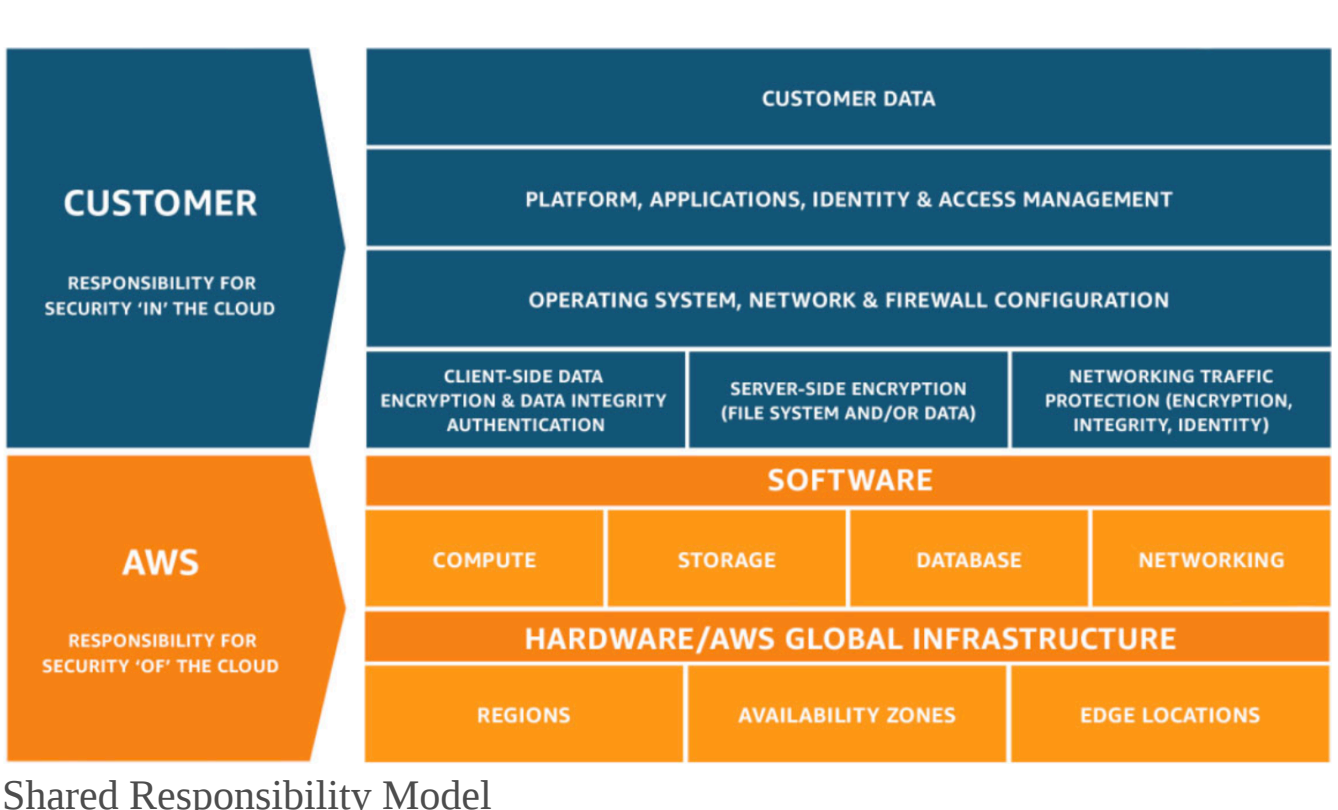
Shared Responsibility Model

The shared responsibility model defines the responsibilities of AWS and the customer:

- **AWS**: Responsible for the security **of** the cloud (e.g., infrastructure, hardware).
- **Customer**: Responsible for security **in** the cloud (e.g., data, access management).



Shared Responsibility Model

By understanding these foundational concepts, you can better leverage AWS services to build and manage secure, scalable, and efficient cloud-based solutions.

Happy Learning !