TECHNOLOGY

AWS Solutions Architect : Associate Level

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AWS Overview

Learning Objectives

By the end of the lesson, you will be able to:

- Describe the history and features of AWS

- Identify the AWS Regions and Availability Zones worldwide

- Identify major AWS services like Compute, Storage, Database, and Networking

- Access AWS services using AWS Management Console

- Set up an AWS account and AWS CLI

Introduction to AWS

What Is AWS?

AWS (Amazon Web Services) is a subsidiary of Amazon offering various cloud services such as Compute, Storage, Database, and Networking, that are flexible, scalable, cost-efficient, and easy-to-use.
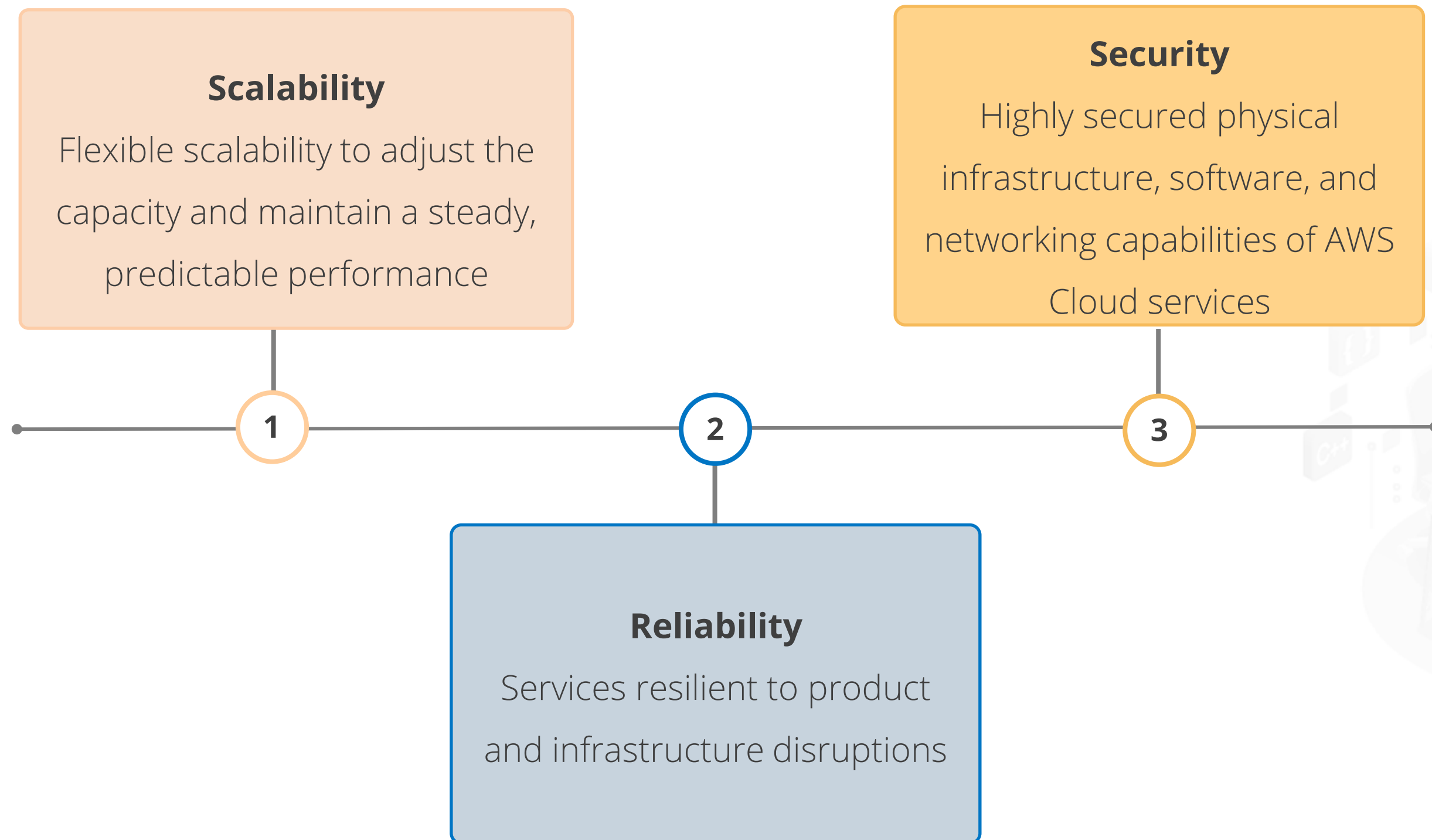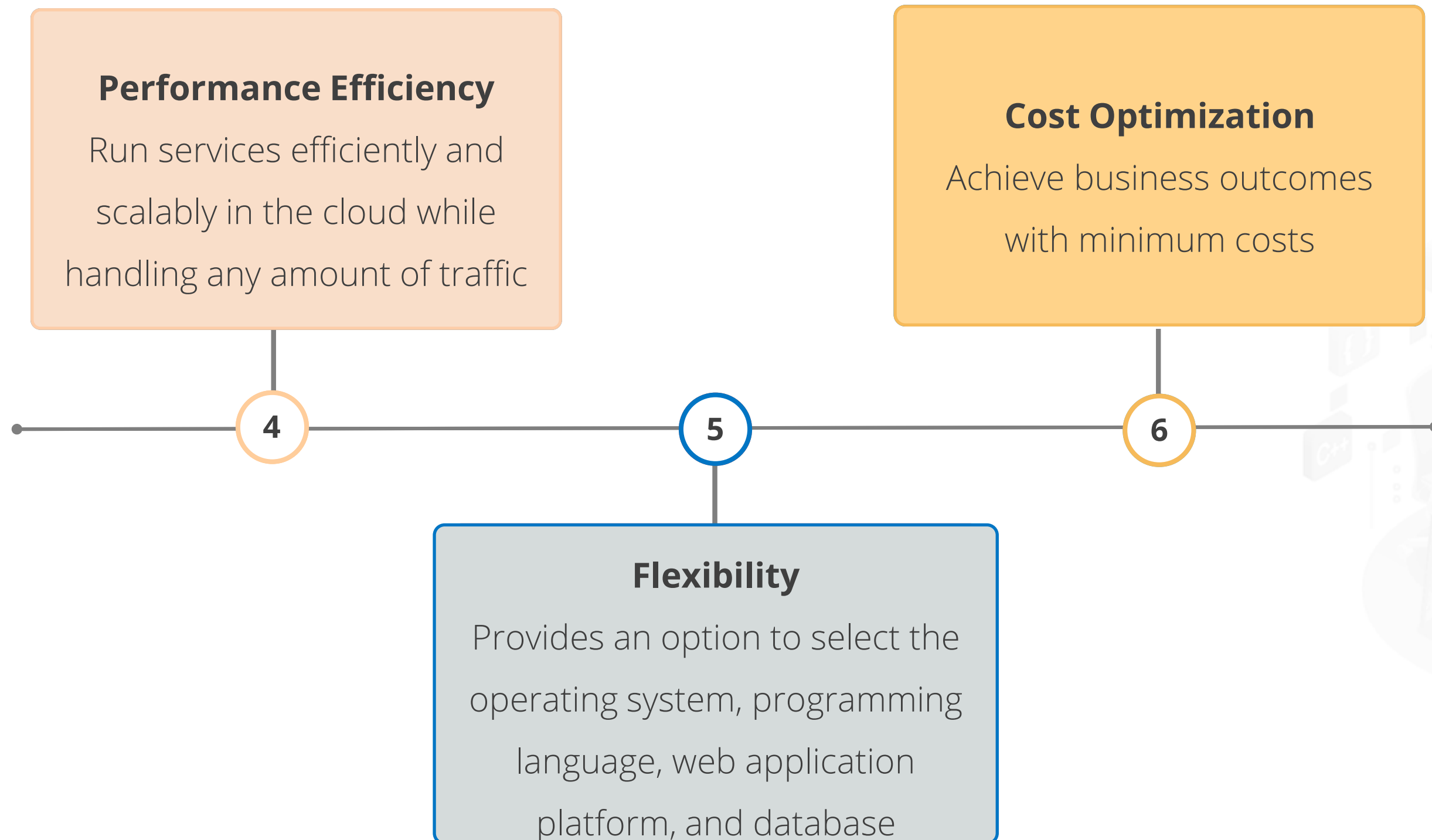
What Is AWS?

Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

Features of AWS

Scalability

Flexible scalability to adjust the capacity and maintain a steady, predictable performance

Security

Highly secured physical infrastructure, software, and networking capabilities of AWS Cloud services

1

2

3

Reliability

Services resilient to product and infrastructure disruptions

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Features of AWS

Performance Efficiency

Run services efficiently and scalably in the cloud while handling any amount of traffic

Cost Optimization

Achieve business outcomes with minimum costs

4

5

6

Flexibility

Provides an option to select the operating system, programming language, web application platform, and database

AWS Regions and Availability Zones

- AWS Cloud Infrastructure is globally distributed in the form of AWS Regions and Availability Zones (AZs).

- AWS Regions are geographic locations around the world with multiple physically separated and isolated AZs.


Major AWS Regions around the world

AWS Regions and Availability Zones

Availability Zone is a cluster of discrete data centers in separate facilities with redundant networking, connectivity, and power. They are:

- Connected to other AZs through high bandwidth and low-latency links

- Highly available, fault tolerant, and scalable

- Safe from issues such as power outages, lightning strikes, tornadoes, and earthquakes
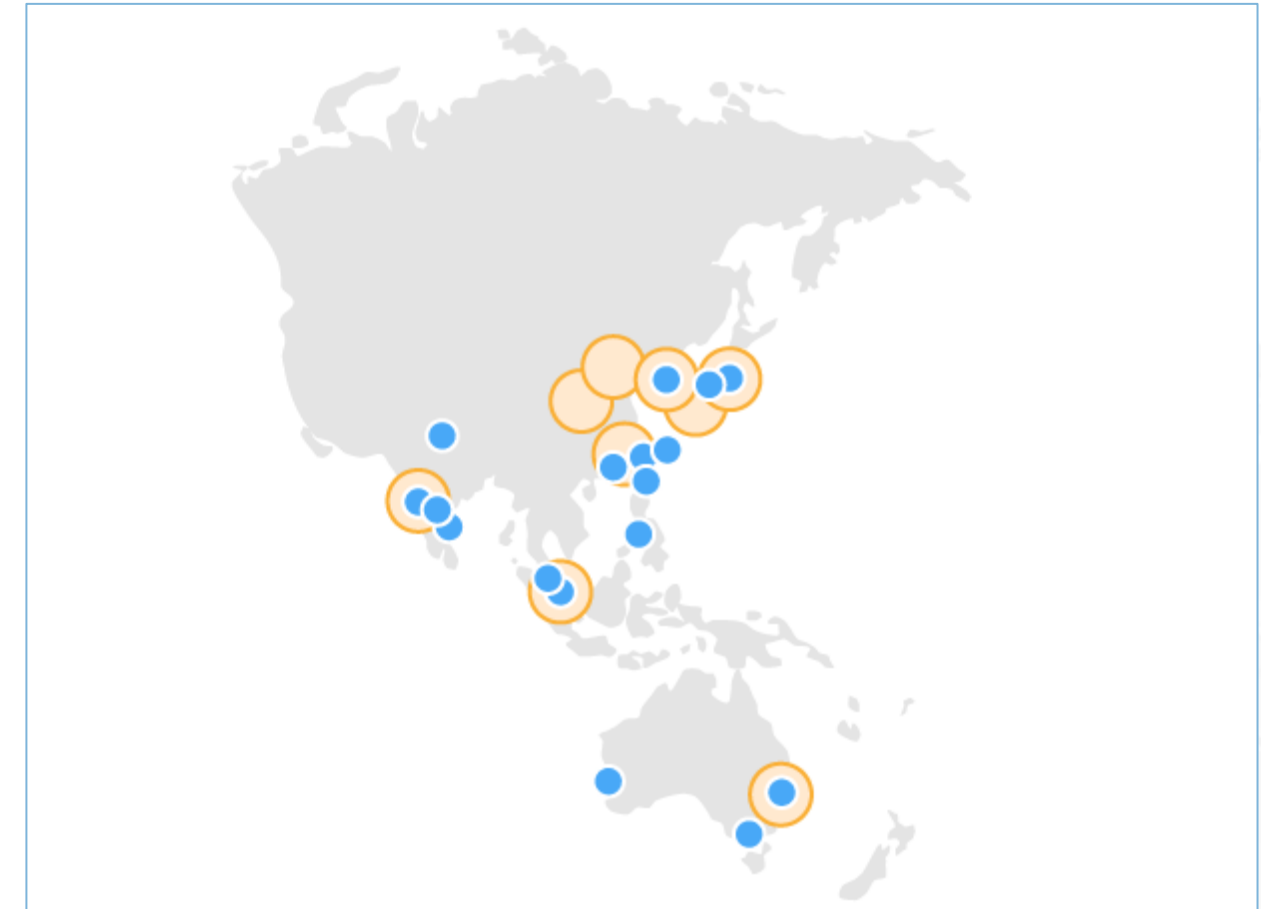
Availability Zones in Asia Pacific Region

Global Distribution

AWS is globally distributed over 24 geographic regions and has 77 Availability Zones.

Regions
Coming Soon

Source: https://aws.amazon.com/about-aws/global-infrastructure/

Core AWS Services

Core AWS Services

Amazon offers various services that are broadly categorized in the following categories:

Compute

Storage

Database

Networking

Compute

The Compute services from Amazon provide resizable compute capacity in the cloud, which is intended to make web-scale computing easier for developers.

- Enables users to control their computing resources

- Operates under pay-as-you-go model and only takes minutes to obtain and boot new server instances

- Allows quick scaling when computing requirements change

Amazon Compute

Compute Services

The following are some of the AWS Compute services:

Amazon EC2

Amazon ECR

Amazon ECS

Amazon EKS

Amazon Lightsail
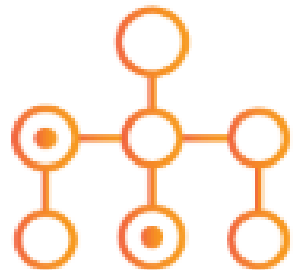
AWS Batch

AWS Elastic Beanstalk

AWS Fargate

AWS Lambda

AWS Serverless Application Repository

Compute Services

Amazon EC2 offers a resizable compute capacity in the cloud that can be scaled up or down to handle changes in requirements, reducing the need to forecast traffic.
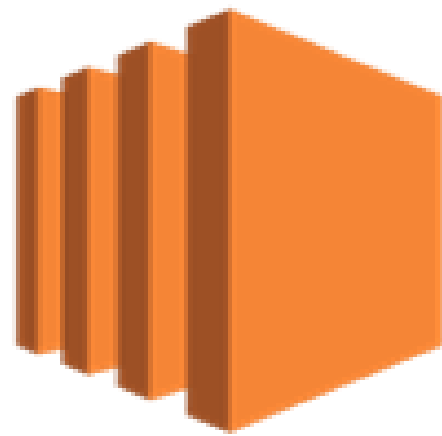
Amazon EC2

Compute Services

Amazon ECR (Elastic Container Registry) is a secure, scalable, and reliable AWS Docker registry service to store, manage, and deploy Docker container images.

Amazon ECR

Compute Services

Amazon ECS (Elastic Container Service) is a highly scalable, fast, and efficient container management service that manages Docker containers on a cluster, hosted on serverless infrastructure.

Amazon ECS

Compute Services

Amazon EKS (Elastic Kubernetes Service) is a fully managed service to run Kubernetes on AWS by handling the installation, deployment, and scaling of Kubernetes containers and clusters.

Amazon EKS

Compute Services

Amazon Lightsail enables developers to create Virtual Private Server (VPS) quickly and easily by including a virtual machine, SSD-based storage, data transfer, DNS management, and a static IP at a reasonable cost.

Amazon Lightsail

Compute Services

AWS Batch is a fully managed service to run batch computing workloads on AWS by providing a large amount of compute resources in response to the jobs submitted.
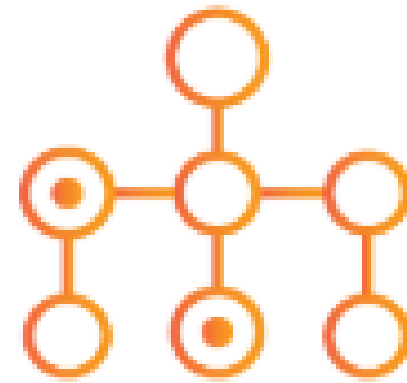
AWS Batch

Compute Services

AWS Elastic Beanstalk is an easy-to-use service to quickly deploy and manage applications by automatically handling the infrastructure and reducing the management complexity without restricting any choices.
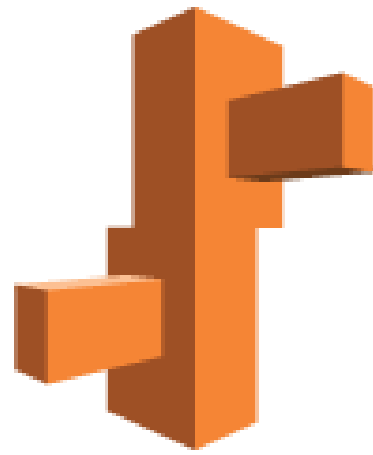
AWS Elastic Beanstalk

Compute Services

AWS Fargate is a fully managed serverless compute engine that runs both the ECS and EKS containers. It allows users to specify and pay for resources per application and improves security.

AWS Fargate

Compute Services

AWS Lambda is a compute service that allows code execution without provisioning or managing servers and scales automatically as per the requests. Users pay only for the compute and execution time.

AWS Lambda

Compute Services

AWS Serverless Application Repository is for developers and enterprises to quickly find, deploy, and publish serverless applications on the AWS Cloud.

AWS Serverless
Application Repository

Storage

The Storage services from Amazon provide a secure, reliable, and scalable place for the data in AWS Cloud with high efficiency, availability, durability, and performance.

- Allow users to store, access, and analyze data to reduce costs, increase agility, and accelerate innovation

- Broadly categorized into object storage, file storage, block storage, backup, and data migration.
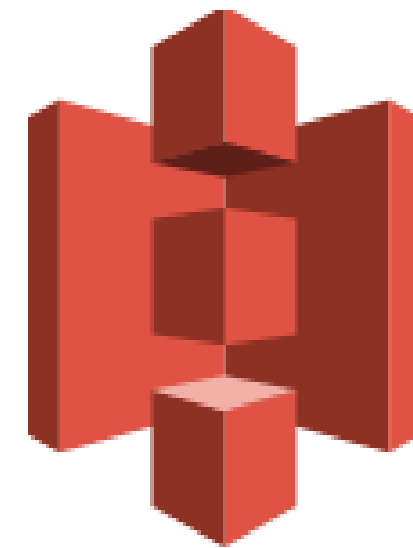
Amazon Storage

Storage Services

The following are some of the AWS Storage services:

Amazon S3

Amazon EFS

Amazon FSx

Amazon EBS

AWS Backup

AWS Storage Gateway

AWS DataSync

AWS Transfer Family

AWS Snow Family

Storage Services

Amazon S3 (Simple Storage Service) is an object-based storage service that allows users to store and retrieve large amounts of data using a highly scalable, fast, and inexpensive data storage infrastructure.
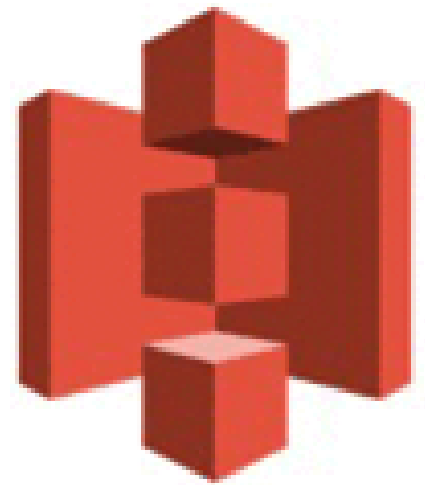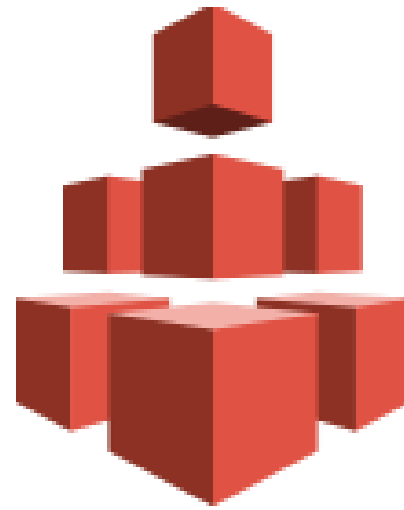

Amazon S3

Storage Services

Amazon EFS (Elastic File System) is file storage for EC2 instances that lets users create and mount a file system on the EC2 instances. It allows users to read and write data to and from the file system.

Amazon EFS

Storage Services

Amazon FSx is a fully managed service that facilitates third-party file systems for workloads such as Windows–based storage, high-performance computing, machine learning, and electronic design automation.

Amazon FSx

Storage Services

Amazon EBS (Elastic Block Store) offers block level storage volumes for EC2 instances. These are highly available and reliable storage volumes that can be attached to any running instance and used as a hard drive.

Amazon EBS

Storage Services

AWS Backup is a fully managed service that helps to centralize, automate, and monitor the backup activities and configure backup policies for multiple AWS resources in one place.

AWS Backup

Storage Services

AWS Storage Gateway is a data transfer service that connects an on-premises software device with cloud-based storage to deliver a secure and seamless integration between an on-premises environment and the AWS Storage infrastructure.

AWS Storage Gateway

Storage Services

AWS DataSync is a data-transfer service that simplifies, automates, and accelerates data migration between on-premises storage and AWS Storage services over the internet or AWS Direct Connect.

AWS DataSync

Storage Services

AWS Transfer Family migrates data to and from Amazon S3 using Secure File Transfer Protocol (SFTP), File Transfer Protocol Secure (FTPS), and File Transfer Protocol (FTP) in a simplified manner.

AWS Transfer Family

Storage Services

AWS Snow Family (AWS Snowcone, Snowball, and Snowmobiles) is a data transfer service that helps customers running operations in austere, non-data center environments, or in low internet network connectivity areas.
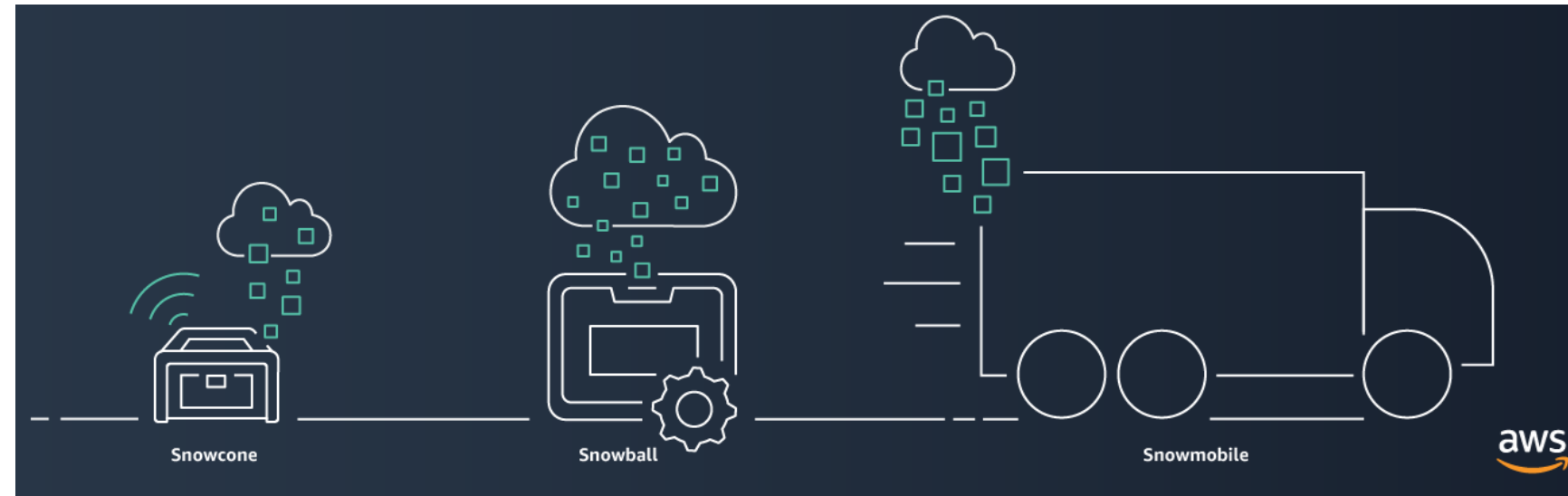
AWS Snow Family

Database

Amazon offers the broadest set of purpose-built databases for various application requirements. These database services are fully managed, scalable, and highly efficient.

- Choose database engines from relational, key-value, in-memory, graph, time-series, and ledger database types

- Support for multi-region, multi-master replication, and full oversight of the data.

Amazon Database

Database Services

The following are some of the Amazon Database services:

Amazon   RDS

Amazon
Redshift

Amazon
DynamoDB

Amazon
ElastiCache

Amazon
DocumentDB

Amazon
Keyspaces

Amazon
Neptune

Amazon
QLDB

Database Services

Amazon RDS (Relational Database Service) is a web service that allows easier setup, operation, and scaling of a relational database in the cloud. Amazon Aurora is a part of this fully managed relational database service.

Amazon RDS

Database Services

Amazon Redshift is a fully managed, high-performance, petabyte-scale data warehouse service that efficiently analyzes all the data using the existing business intelligence tools.
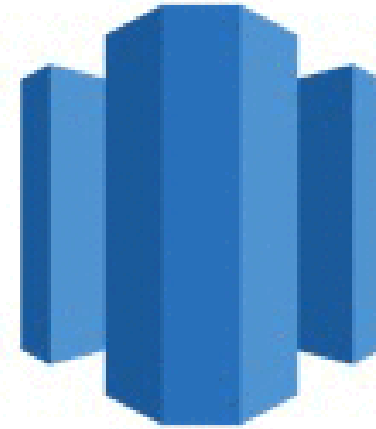
Amazon Redshift

Database Services

Amazon DynamoDB is a fully managed NoSQL database service that facilitates fast and predictable performance with seamless scalability.

Amazon DynamoDB

Database Services

Amazon ElastiCache is a database service offering high-performance, resizable, and cost-effective in-memory cache, allowing users to set up, manage, and scale distributed in-memory cache environments in the AWS Cloud.

Amazon ElastiCache

Database Services

Amazon DocumentDB is a fully managed database service that is fast, reliable, and scalable. It helps to easily set up, operate, and scale MongoDB-compatible databases in the cloud.

Amazon DocumentDB

Database Services

Amazon Keyspaces is a highly available, scalable, and manageable Apache Cassandra compatible database service, automatically managing servers and eliminating the need to install, maintain, and operate the software.

Amazon Keyspaces

Database Services

Amazon Neptune is a graph database service that helps to build and run applications working with highly connected datasets. It runs on a purpose-built, high-performance graph database engine.

Amazon Neptune

Database Services

Amazon Quantum Ledger Database (QLDB) is a high-performance, fully managed ledger database that offers a transparent, immutable, and cryptographically verifiable transaction log owned by a central trusted authority.

Amazon QLDB

Networking

Amazon provides a broad set of networking services that provide essential security features by isolating resources, encrypting data, and connecting privately on the AWS global network.

- Offers highest network availability, with very few down time hours from networking issues

- 24 AWS Regions and 77 Availability Zones providing global coverage

Amazon Networking

Networking Services

The following are some of the Amazon Networking services:

Amazon VPC

Amazon API Gateway
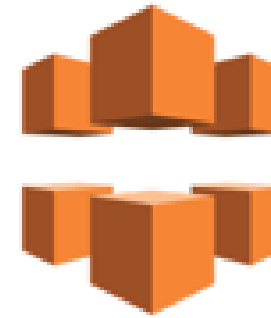
Amazon CloudFront

Amazon Route 53

AWS VPN

AWS Direct Connect

AWS Cloud Map

AWS App Mesh

Networking Services

Amazon VPC (Virtual Private Cloud) allows users to launch AWS resources into a user-defined virtual network that closely resembles a traditional network, with the benefits of using the scalable infrastructure of AWS.

Amazon VPC

Networking Services

Amazon API Gateway helps to create and deploy robust, secure, and scalable REST and WebSocket APIs that access AWS or other web services, as well as data that is stored in the AWS Cloud.

Amazon API Gateway

Networking Services

Amazon CloudFront speeds up the distribution of static and dynamic web content through a worldwide network of edge locations that provide low latency and high-performance.
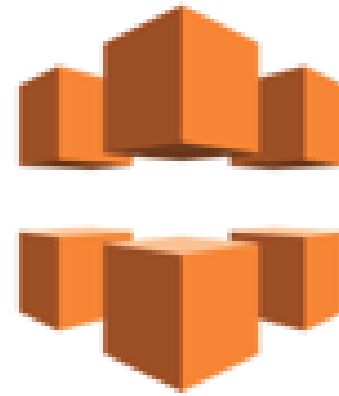
Amazon CloudFront

Networking Services

Amazon Route 53 is a highly scalable and available Domain Name System (DNS) web service for domain registration, DNS routing, and health checking.

Amazon Route 53

Networking Services

AWS Virtual Private Network (VPN) establishes a secure and private tunnel from a local network to the AWS Cloud. An existing on-premises network can be extended into a VPC, or other AWS resources can be connected from a client.

AWS VPN

Networking Services

AWS Direct Connect links user's internal network to an AWS Direct Connect location over a standard 1 gigabit or 10 gigabit Ethernet fiber-optic cable.

AWS Direct Connect

Networking Services

AWS Cloud Map is a fully managed service that can be used to create and maintain a map of the backend services and resources that an application depends on.

AWS Cloud Map

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Networking Services

AWS App Mesh is a service mesh allowing users to easily monitor and control the services. It standardizes the communication between services, provides end-to-end visibility, and ensures high availability for the applications.

AWS App Mesh

Accessing AWS Services

AWS Sign Up

The following are the steps to set up an AWS Account:

```
┌─────────────────────┐        ┌─────────────────────┐        ┌─────────────────────┐
│ Open AWS home page  │  ───>  │ Enter your account  │  ───>  │ Select Personal or  │
│ and select Create an│        │ information, and then│       │ Professional account│
│ AWS Account         │        │ click on Continue   │        │ type                │
└─────────────────────┘        └─────────────────────┘        └─────────────────────┘
          (1)                            (2)                            (3)
                                                                          │
                                                                          v
┌─────────────────────┐        ┌─────────────────────┐        ┌─────────────────────┐
│ Click on Create     │  <───  │ Read and accept the │  <───  │ Enter your company or│
│ Account and Continue│        │ AWS Customer        │        │ personal information │
│                     │        │ Agreement           │        │                     │
└─────────────────────┘        └─────────────────────┘        └─────────────────────┘
          (6)                            (5)                            (4)
```

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AWS Sign Up

The following are the steps to set up an AWS Account:

Add a payment method on the **Payment Information** page, and then select **Verify and Add**

7

Enter a phone number, verify it with the PIN received, and then click on **Continue**

8

Confirmation page indicates the **account is being activated**

10

Select **AWS Support Plan** on the **Select a Support Plan** page

9

Introduction to AWS Management Console

AWS Management Console is a web application consisting a wide collection of service consoles for managing Amazon Web Services.

Introduction to AWS Management Console

AWS Management Console home page provides access to each service console that offers tools for working with services such as Amazon S3, EC2, and CloudFront.

CloudFront

Distributions
Policies
What's new ✳

▼ **Telemetry**

Monitoring
Alarms
Logs NEW

▼ **Reports & analytics**

Cache statistics
Popular objects
Top referrers
Usage
Viewers

Enable new real-time metrics for better visibility of your traffic. Learn more

CloudFront Distributions

| Create Distribution | Distribution Settings | Delete | Enable | Disable | ⟳ |

Viewing : | Any Delivery Method ⌄ | Any State ⌄ | | ⟪ ‹ Viewing 1 to

	Delivery Method	ID ▼	Domain Name	Comment	Origin	CNAMEs	Status	State
☐	🌐 Web	E1C0LYIC3U82EX	d2e3bwyziod35b.cl	-	simpli-first-c	-	Deployed	Enabled
☐	🌐 Web	E3ASMEOOYCIWRO	d19ck3jkt3g9td.clo	-	simpli-first-c	-	Deployed	Disabled

⟪ ‹ Viewing 1 to

Introduction to AWS Management Console

Resource Groups menu manages the AWS resources such as an EC2 instance or an S3 bucket as a group.

Introduction to AWS Management Console

Resource Groups menu can also be used to start Tag Editor, a tool for managing and applying labels or tags to organize your resources.
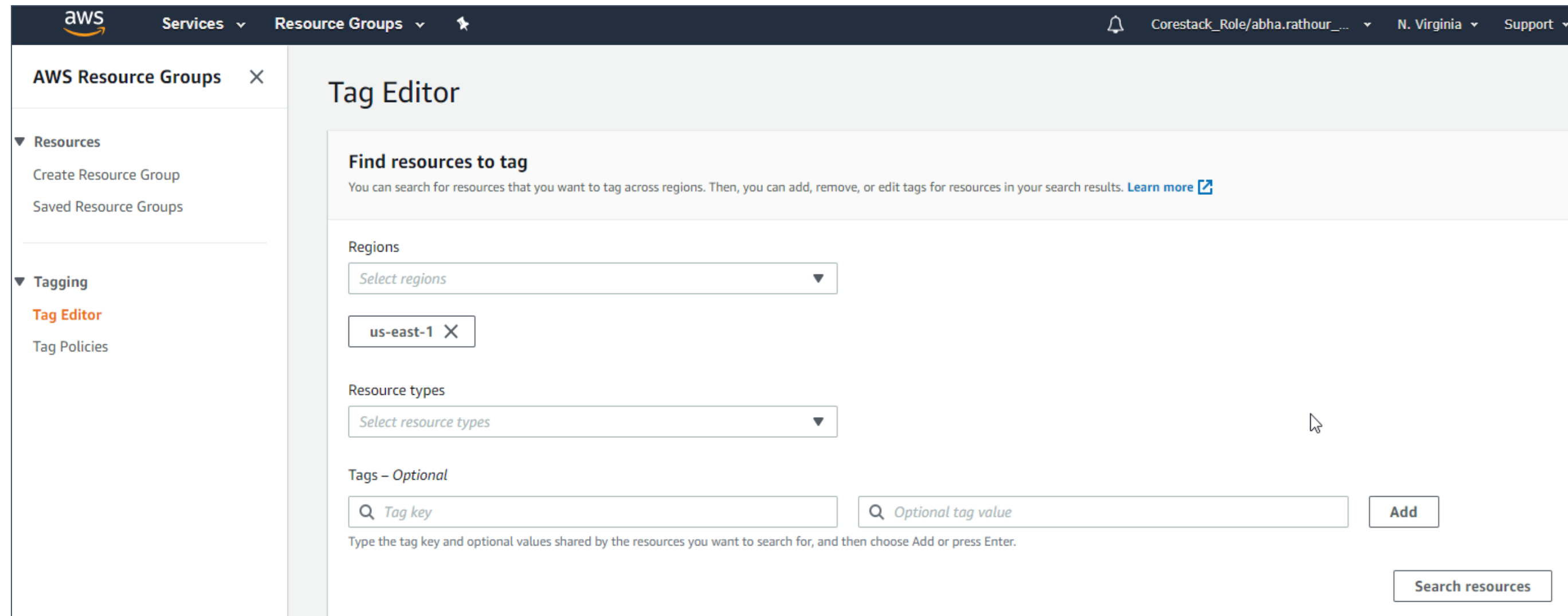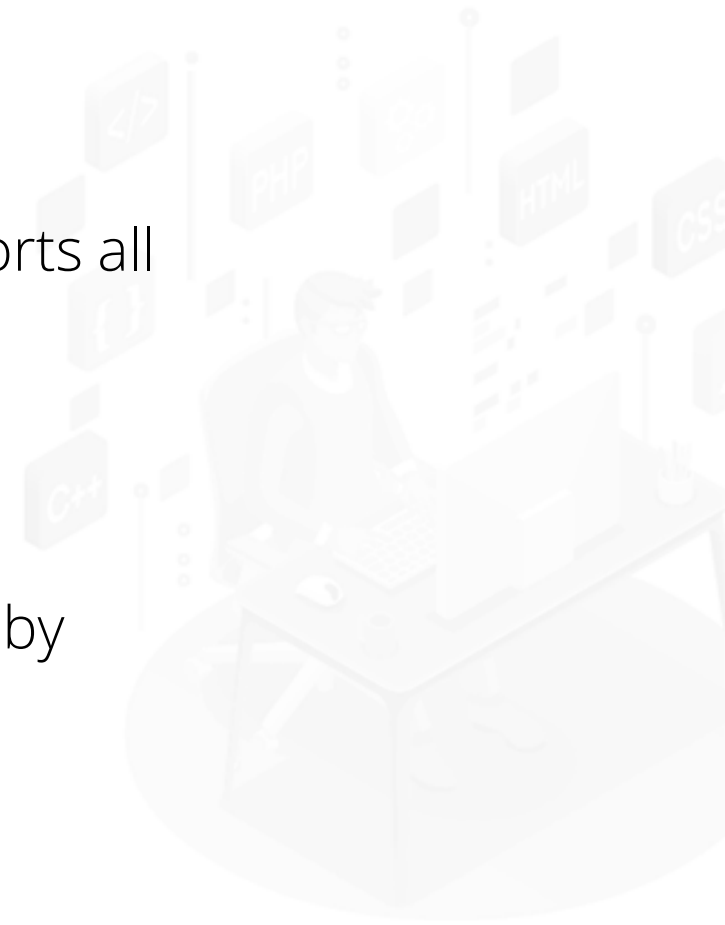
Introduction to AWS CLI

AWS Command Line Interface (CLI) is an open-source tool that allows users to interact with AWS services using commands in the command-line shell.

Introduction to AWS CLI

AWS CLI is available in two versions:

- **AWS CLI version 2:** It is the most recent major version of AWS CLI and supports all the latest features. Some features introduced in version 2 are not backward compatible with version 1.

- **AWS CLI version 1:** It is the original version of AWS CLI and is still supported by AWS. It is available only for backward compatibility.

Introduction to AWS CLI

AWS CLI can be used from the command prompt in any terminal program:

- **Linux shells** – Shell programs such as *bash*, *zsh*, and *tcsh* can be used to run commands in Linux or macOS.

- **Windows command-line** – Windows Command Prompt or PowerShell can be used to run commands.

- **Remotely** – Amazon EC2 instances can be used to run commands through a remote terminal program such as PUTTY or SSH.

Set Up the AWS Command Line Interface

Problem Statement:

You have been asked to set up the AWS Command Line Interface.

Assisted Practice: Guidelines to Set Up the AWS Command Line Interface

Steps to perform:

1. Setting up the AWS CLI on Windows

    1. Download the AWS CLI MSI installer for Windows

    2. Run the downloaded MSI installer

    3. Confirm the installation using command prompt

1. Setting up the AWS CLI on Linux

    1. Download the installation file using the curl command

    2. Unzip the installation file using the unzip command

    3. Run the install program and confirm the installation

Key Takeaways

- AWS (Amazon Web Services) is a subsidiary of Amazon offering cloud services such as Compute, Storage, Database, and Networking.

- Operational and performance efficiency, reliability, security, scalability, and cost optimization are some of the main features of AWS.

- AWS is globally distributed over 24 geographic regions and has 77 Availability Zones.

- AWS Management Console is a web application that comprises a wide collection of service consoles for managing Amazon Web Services.

- AWS CLI is an open-source tool that allows users to interact with AWS services using commands in the command-line shell.

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