CLOUD CERTIFICATION -AWS


Introduction to Cloud Computing
Cloud Computing Service Models
Cloud Deployement Models

WHAT IS CLOUD COMPUTING?

1. Cloud Computing is the on-demand delivery of IT resources (like servers, storage, databases, networking, software) over the internet on a pay-as-you-go basis.

WHAT IS CLOUD COMPUTING?

FeatureDescription

On-Demand Access- Resources available anytime without manual provisioningScalability

Easily scale up or down based on usage

Pay-as-you-go-Pay only for what you use—no upfront investment

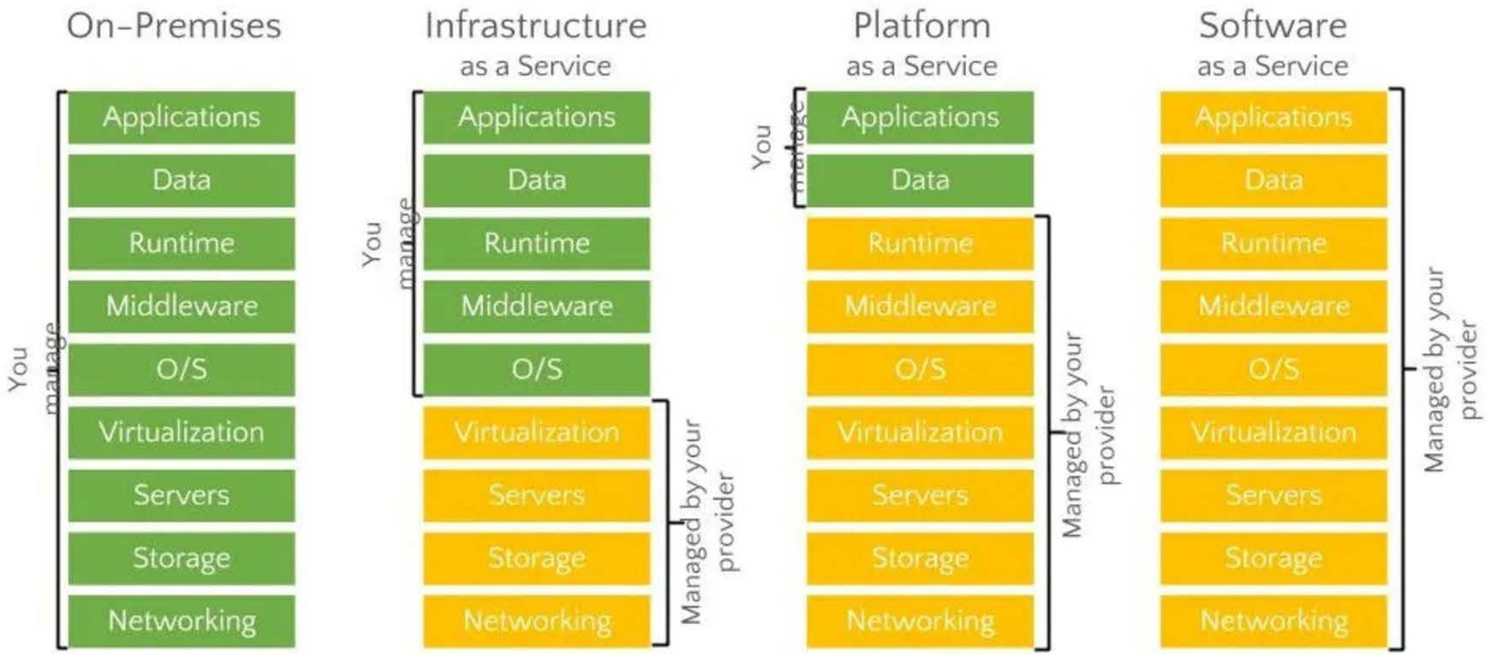
Global Access-Access from anywhere using internet

A**utomatic Updates-**Software and hardware updates are managed by the provider

CLOUD COMPUTING SERVICE MODELS

1. IAAS - Infrastructure As A Service
2. PAAS -Platform As A Service
3. SAAS - Software As A Service

CLOUD COMPUTING SERVICE MODELS



SOFTWARE AS A SERVICE

- **Ready-to-use software delivered over the internet.**
- **Users don’t manage infrastructure or platforms—just use the software.**
- **Accessible via web browsers with minimal setup.**
- **Example: Google Workspace (Gmail, Google Drive), Microsoft 365.**

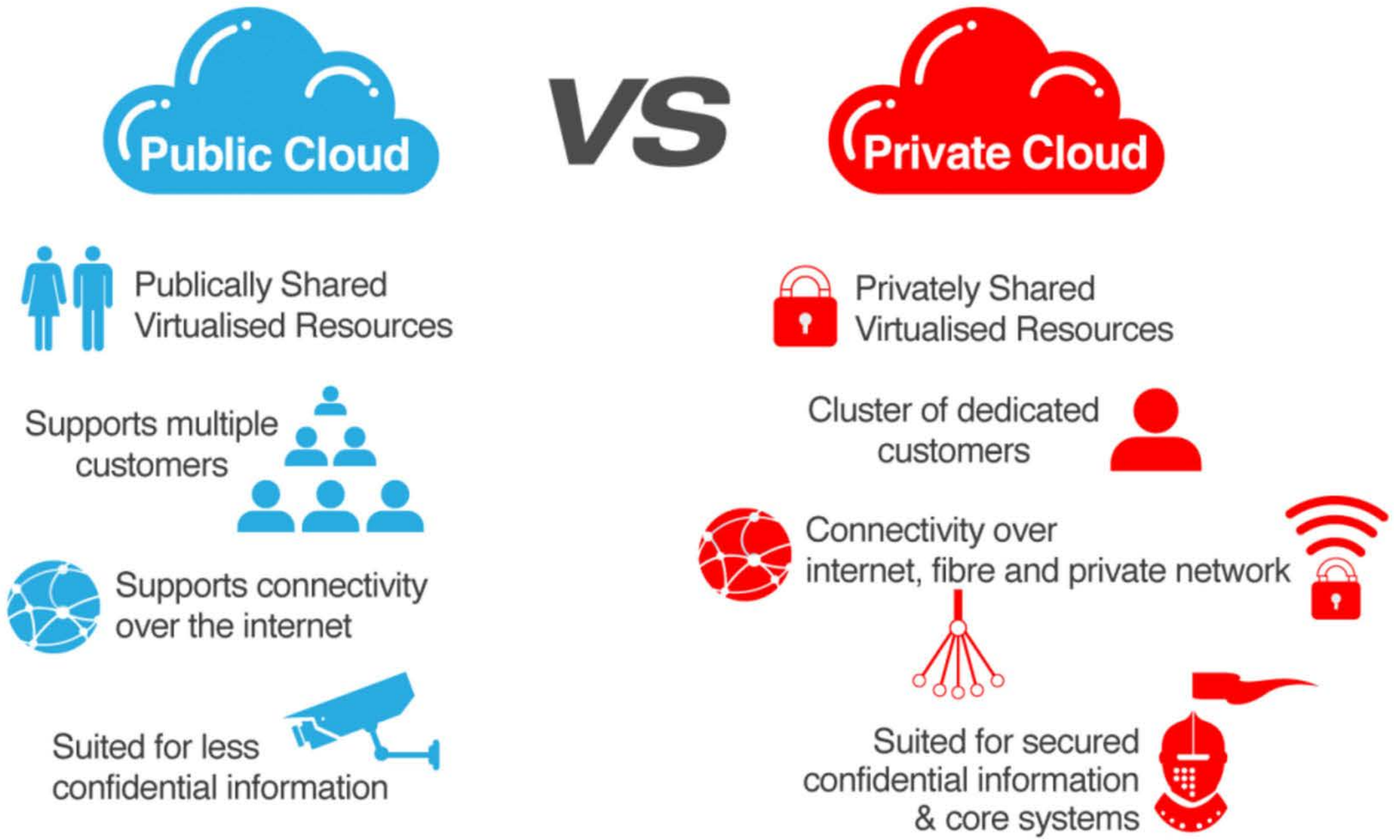
PLATFORM AS A SERVICE

- **Provides tools and environment to build, test, and deploy applications.**
- **Developers focus only on coding—no need to manage servers or OS.**
- **Scales automatically and supports continuous integration.**
- **Example: Heroku, Google App Engine.**

INFRASTRUCTURE AS A SERVICE

- **Offers virtualized hardware resources like servers, storage, and networking.**
- **Users manage OS, applications, and runtime—provider handles hardware.**
- **Ideal for building custom platforms or hosting enterprise applications.**
- **Example: Amazon EC2, Microsoft Azure Virtual Machines.**

CLOUD COMPUTING MODELS



PUBLIC CLOUD

- **Definition:** Cloud services offered over the internet and shared among multiple users.
- **Advantages:** Cost-effective, easily scalable, no hardware maintenance.
- **Disadvantages:** Less control and more security concerns.
- **Examples:** Amazon Web Services (AWS), Microsoft Azure, Google Cloud

PRIVATE CLOUD

- **Definition:** Cloud infrastructure dedicated to a single organization.
- **Advantages:** Higher security, control, and customization.
- **Disadvantages:** Expensive to set up and maintain.
- **Examples:** VMware vSphere, OpenStack private deployments.

HYBRID CLOUD

- **Definition:** Combination of public and private cloud environments.
- **Advantages:** Flexibility to move workloads, better optimization.
- **Disadvantages:** Complex integration and security challenges.
- **Examples:** Microsoft Azure Stack, AWS Outposts.

COMMUNITY CLOUD

- **Definition:** Shared cloud for a specific group of organizations with similar needs.
- **Advantages:** Cost and resource sharing, tailored to industry needs.
- **Disadvantages:** Limited availability, complex governance.
- **Examples:** Government or healthcare shared cloud services.

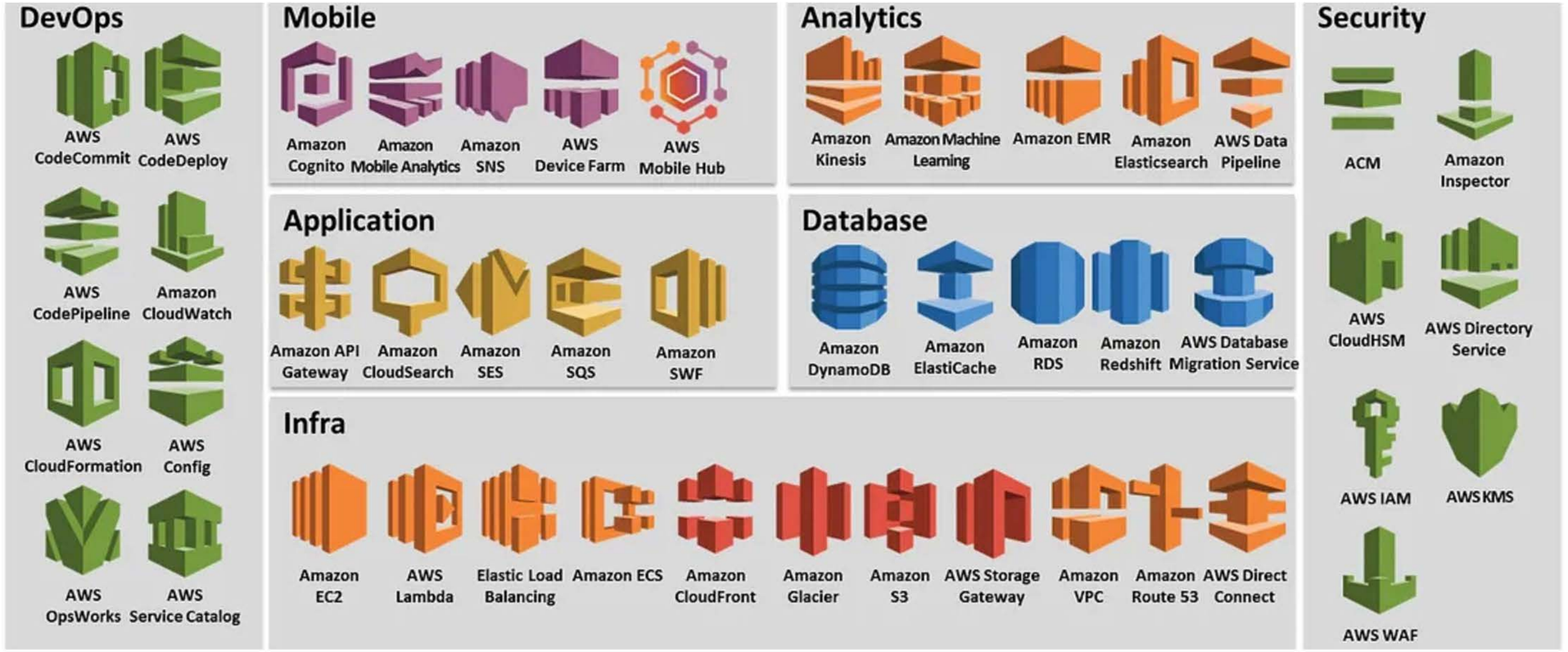
AWS OVERVIEW AND HISTORY

- Amazon Web Services (AWS) is a cloud computing platform launched by Amazon in 2006.
- It started with services like S3 (storage) and EC2 (compute).
- AWS is the market leader in cloud computing, offering scalable, reliable, and low-cost infrastructure solutions.
- It supports businesses of all sizes—from startups to enterprises to government.

AWS GLOBAL INFRASTRUCTURE

- **Region**: A geographical area (like us-east-1, ap-south-1) with multiple, isolated Availability Zones.
- **Availability Zone (AZ):** One or more physically separate data centers in a region with independent power, networking, and cooling.
- This model helps in disaster recovery, fault isolation, and better application performance.
- **Example**: Mumbai Region (ap-south-1) has 3 Availability Zones.

AWS SERVICES



AWS SERVICES

AWS offers 200+ fully featured services under several categories:

A	B
Category	**Examples**
Compute	EC2, Lambda, Elastic Beanstalk
Storage	S3, EBS, Glacier
Database	RDS, DynamoDB, Aurora
Networking	VPC, Route 53, CloudFront
Security	IAM, KMS, Shield, Cognito
Analytics	Athena, Redshift, EMR
AI/ML	SageMaker, Rekognition, Comprehend
DevOps Tools	CodeDeploy, CodePipeline, CloudFormation
Migration	Snowball, DMS, Migration Hub

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Introduction to AWS

Introduction to AWS

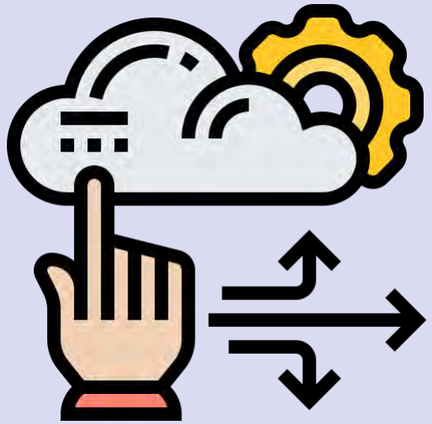
Welcome to the world of AWS, the most secure, flexible and scalable cloud computing platform. With AWS, you can build and deploy any application or software with ease.

What is AWS?

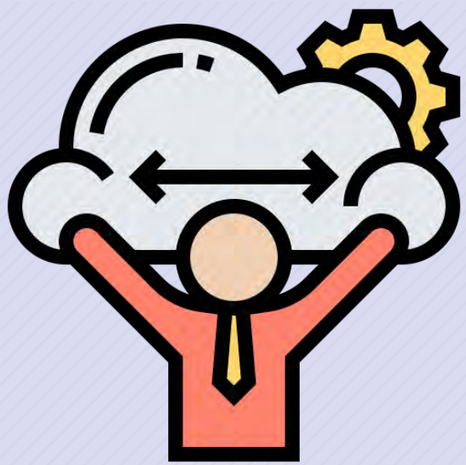
Amazon Web Services (AWS) is a cloud computing platform that offers a wide range of services including computing power, storage, security, analytics, and more. It is a comprehensive platform that enables developers to build and deploy applications quickly and efficiently.

Security

Flexible



Scalable



Usage of AWS Cloud

AWS Infrastructure

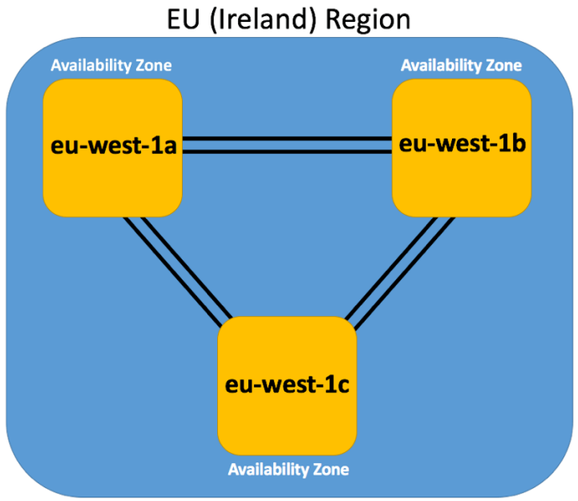
AWS has a global infrastructure comprising data centers, availability zones, and regions designed to provide high availability and durability for your applications and content.

1

Data Centers

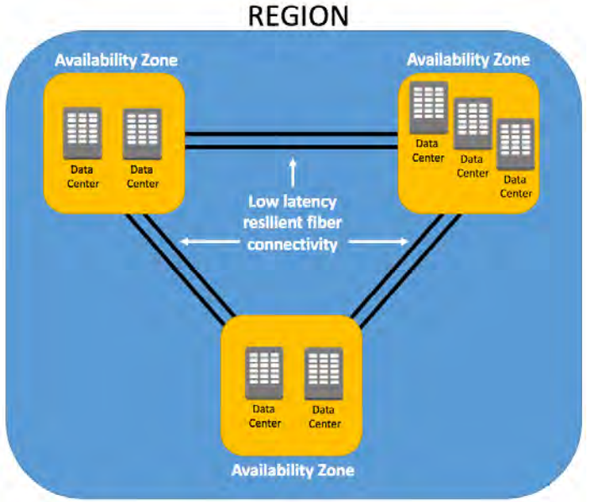
2

Availability Zones



3

Regions

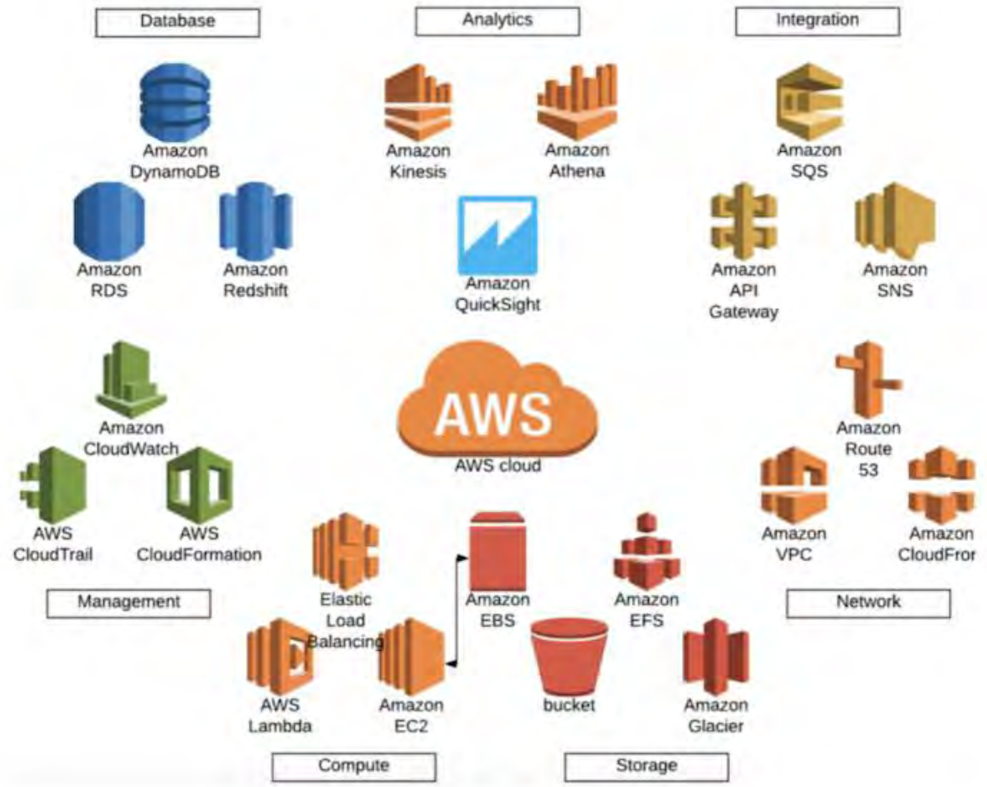


Advantages of AWS

There are many advantages to using AWS, including cost savings, ease of use, innovation, and more.

AWS Services Overview

With AWS, you can architect your applications using the most suitable architecture that meets your needs. Whether it's a simple web application or a complex distributed application with multiple tiers, AWS provides the tools and services you need to build and deploy it with ease.



AWS Service Overview

Amazon Web Services (AWS) provides a comprehensive cloud computing platform that offers a wide range of services to meet the needs of customers. Some of the major services include:

1 Compute

Services like EC2, Lambda, and Elastic Beanstalk provide scalable computing resources for running applications and workloads.

2 Storage

Services like S3, EBS, and Glacier provide scalable and durable storage for data and applications.

3 Database

Services like RDS, DynamoDB, and Aurora provide managed database solutions for different types of data and workloads.

4 Analytics

Services like Redshift, Athena, and QuickSight provide tools for data processing, warehousing, and analysis.

AWS Service Overview

5 Machine Learning

Services like SageMaker, DeepLens, and Rekognition provide pre-built models and tools for machine learning and AI applications.

6 Networking and Content Delivery

Services like VPC, CloudFront, and Route 53 provide tools for building and managing network infrastructure and content delivery networks.

7 Security, Identity, and Compliance

Services like IAM, Inspector, and GuardDuty provide tools for managing security, identity, and compliance in the cloud.

AWS Pricing Model

One of the many benefits of AWS is the pay-as-you-go pricing model, which is designed to provide cost savings and flexibility for customers.

Services	Pricing Model
Amazon EC2	Pay per instance per hour
Amazon S3	Pay per GB stored per month
Amazon RDS	Pay per hour per instance
Amazon Lambda	Pay per 100ms of execution time

Getting Started with AWS

Getting started with AWS is easy, with a range of resources and tools available to help you along the way. Here are some tips to help you get started:

1. Choose your platform

Choose the AWS platform that best meets your needs, whether it's EC2, S3, RDS, Lambda or something else.

2. Create your account

Sign up for an AWS account and provide your billing and payment information.

3. Launch your instance

Launch your instance and configure it as per your requirements.

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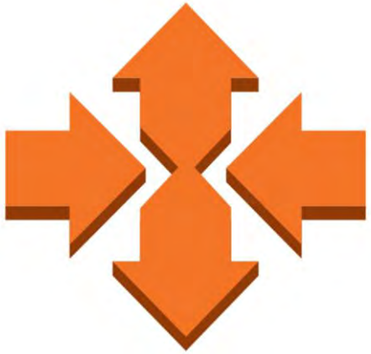
AWS Cloud Benefits

Agenda

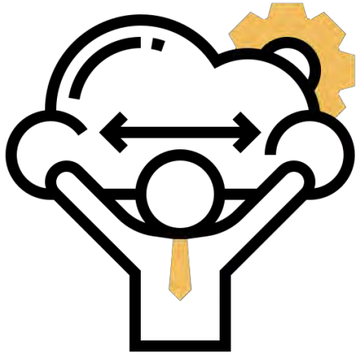
- Scalability of AWS Cloud
- Cost-effectiveness of AWS Cloud
- Reliability and Availability of AWS Cloud
- Security of AWS Cloud
- Flexibility of AWS Cloud
- Benefits to Business and Operations
- Cost Optimization

Scalability of AWS Cloud

1 **Auto Scaling**



2 **Elasticity**



3 **Pre-Defined Services**

Choose from pre-defined services that automatically scale based on the demand they receive.

4 **Developer Tools**

Make scalability easier and more intuitive with AWS developer tools.

Cost-effectiveness of AWS Cloud

No Upfront Payments

You pay for what you use, with no upfront costs or long-term commitments.

Simple Cost Management

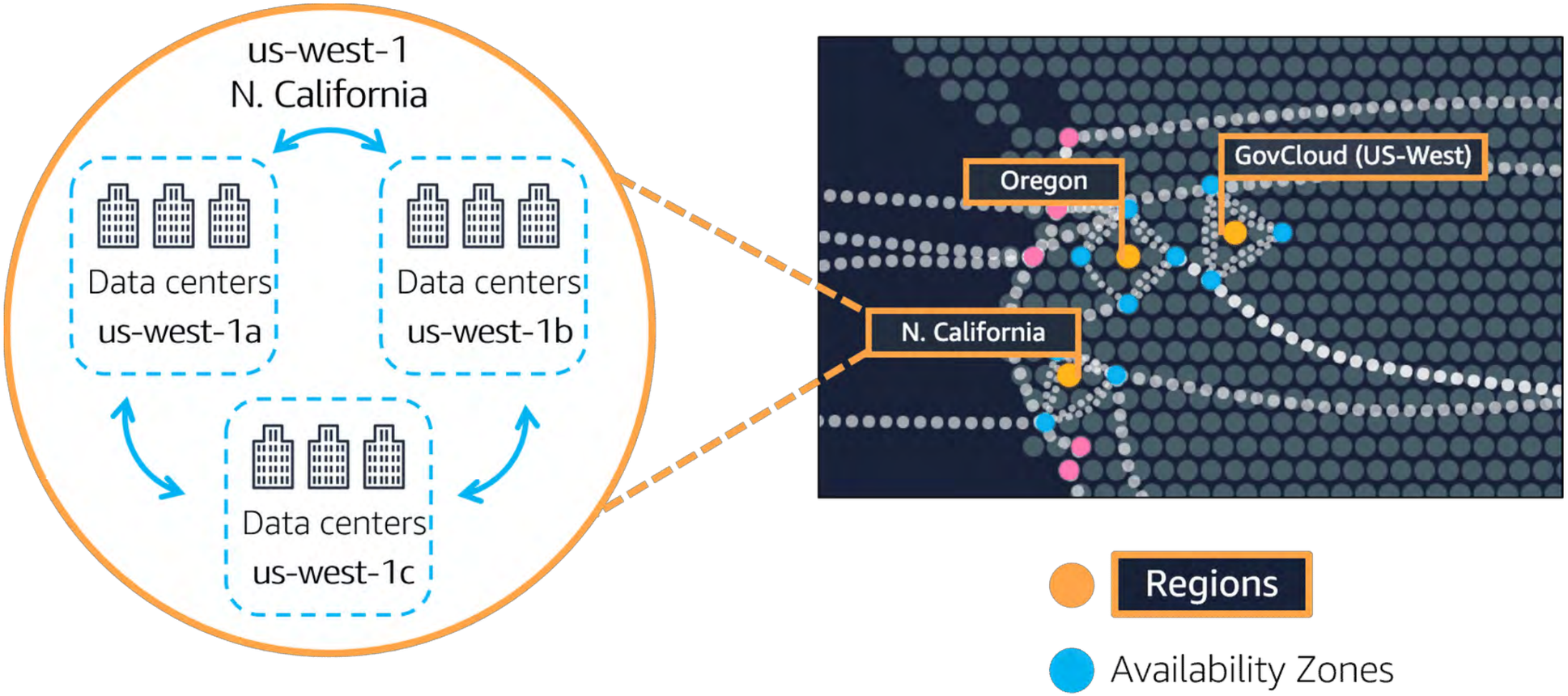
Use AWS Cost Explorer to manage and optimize your cloud costs easily.

Maximize Efficiency

Use resources only when needed to maximize utilization and efficiency.

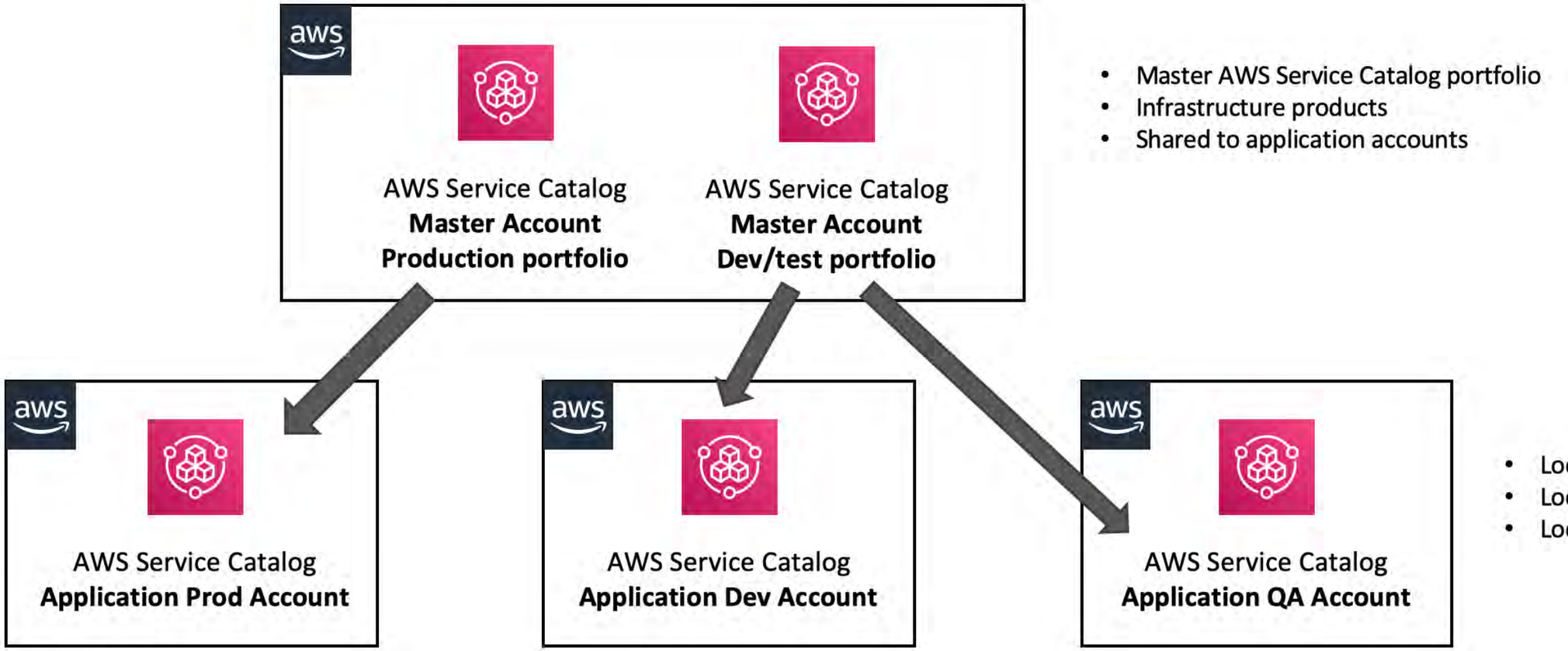
Reliability and Availability of AWS Cloud

Multiple Availability Zones



Reliability and Availability of AWS Cloud

Distributed Infrastructure

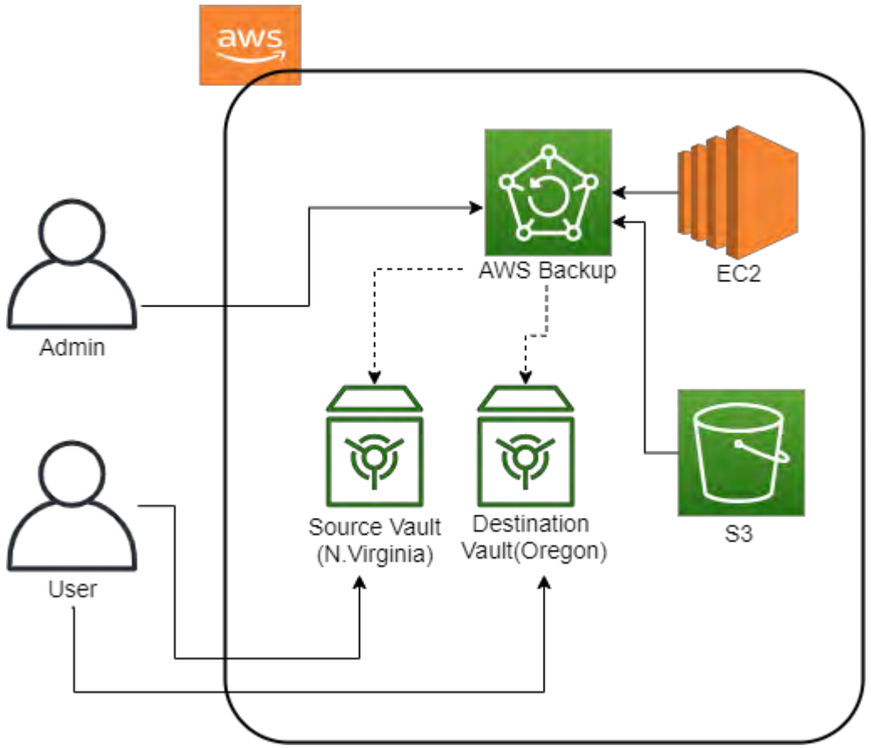


- Master AWS Service Catalog portfolio
- Infrastructure products
- Shared to application accounts

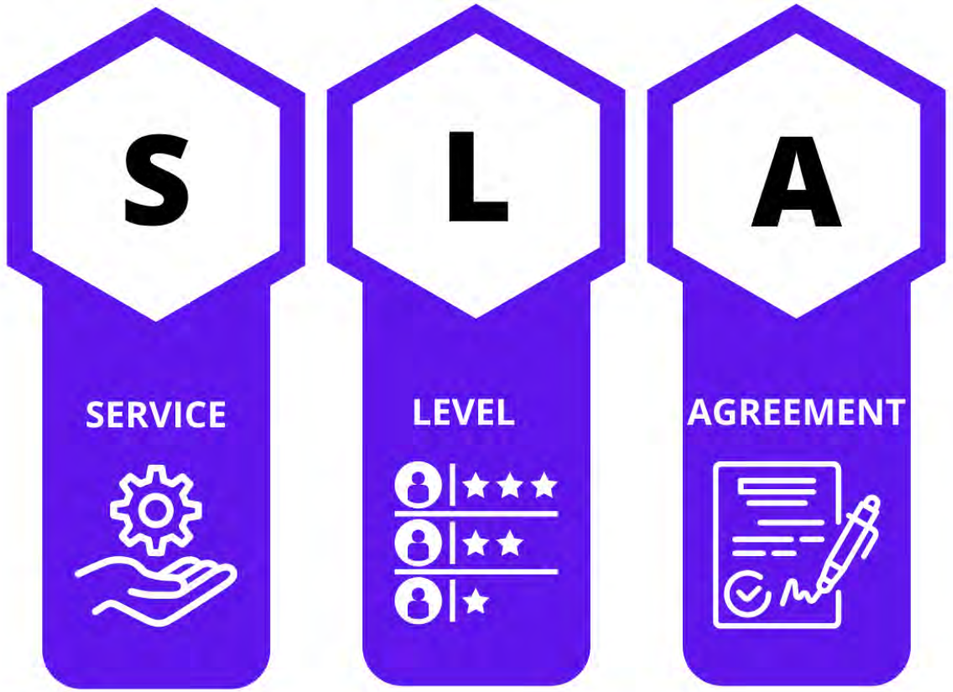
- Local AWS Service Catalog portfolio
- Local permissions
- Local launch constraints

Reliability and Availability of AWS Cloud

Replication and Backups



Service Level Agreement

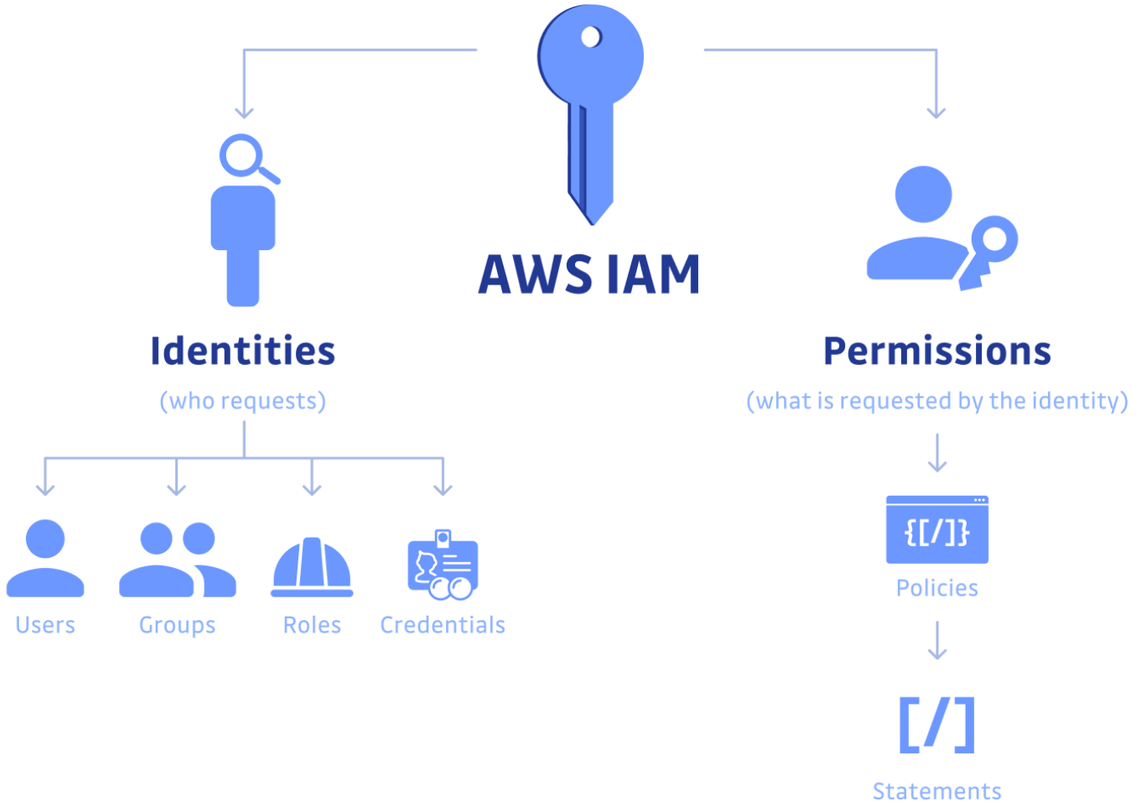


Security of AWS Cloud

Managed Security Services

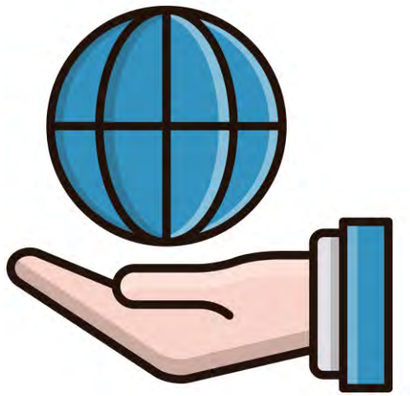
Data Encryption

Identity and Access Management

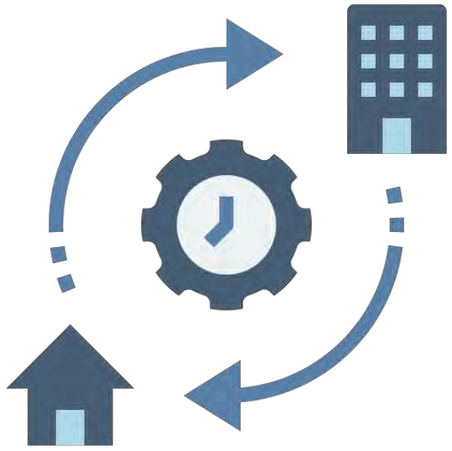


Flexibility of AWS Cloud

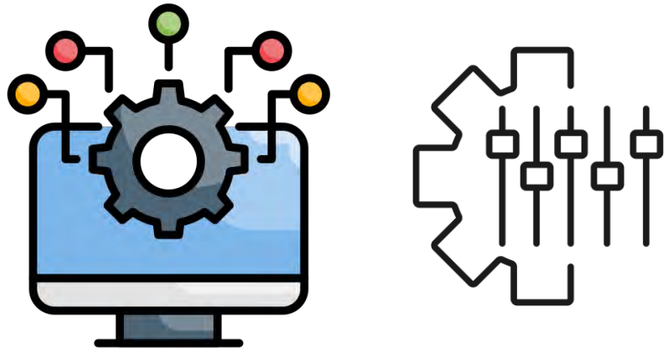
Wide Range of Services



Hybrid Environments



Integration and Customization



Open Standards and Platforms

Build and deploy on open standards and platforms, giving you more freedom in your technology choices.

Flexibility of AWS Cloud

Wide Range of Services

Choose from a wide range of services and solutions to meet your specific needs and requirements.

Hybrid Environments

Combine AWS with on-premises solutions for a hybrid cloud and bridge the gap to the cloud at your own pace.

Integration and Customization

Customize and integrate your solutions with a range of APIs and tools, including AWS Lambda, to suit your unique needs.

Open Standards and Platforms

Build and deploy on open standards and platforms, giving you more freedom in your technology choices.

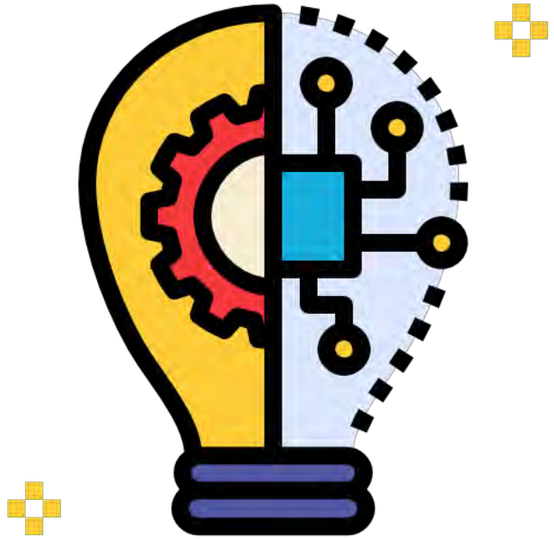
Benefits to Business and Operations

Increased Agility

Build and deploy software faster, with higher quality, and with better alignment to your business needs.

Improved Innovation

Use AWS tools and solutions to rapidly prototype, test, and experiment with new solutions and ideas.



Better Resource Utilization

Scale resources up or down to meet demand, allowing you to better utilize resources and reduce waste.

Cost Optimization

Cut Costs

Use AWS Cost Explorer to identify cost-saving opportunities and eliminate unnecessary spending.

Optimize Resources

Use AWS Trusted Advisor to optimize resource utilization and reduce costs by using the right resources for the right job.

Reserved Instances

Save money by reserving instances when you know you'll need them in advance.

Global Reach

Wide Availability

Deploy your applications to anywhere in the world with AWS's widespread infrastructure availability.

High Performance

Have consistently high performance for applications delivered across the globe.

Regulatory Requirements

Stay compliant with the various regulatory requirements across different countries.

Innovation

1

New Features and Services

Constantly be up-to-date with the latest technologies and innovations y only AWS can offer.

2

Machine Learning Services

Get started on machine learning right away with pre-built models or train your own custom models with Amazon SageMaker.

3

Internet of Things (IoT)

Connect all your IoT devices to the AWS cloud with a variety of services and tools for information streams, device management and data storage.

Case Studies and Success Stories

Netflix

- Netflix runs its entire streaming service on Amazon Web Services (AWS). AWS provides Netflix with a scalable, reliable, and cost-effective infrastructure that allows them to deliver content to millions of users around the world.
- By using AWS, Netflix is able to quickly launch new features, process large amounts of data, and respond to changes in demand. AWS has helped Netflix reduce costs and increase agility, enabling them to focus on delivering high-quality content to their subscribers.

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AWS Regions and Availability Zones

Introduction to AWS Infrastructure

Amazon Web Services is a secure, cost-effective, and reliable cloud service provider with a presence in over 190 countries. Get an overview of the global infrastructure of AWS, including Regions, Availability Zones, and Edge Locations.

Regions, Availability Zones, and Edge Locations

Regions

- AWS has 25 Regions globally, made up of geographically separated data centers.
- Each Region is a separate geographic area, designed to be isolated from every other Region.
- Resources aren't replicated across regions unless you do so specifically.

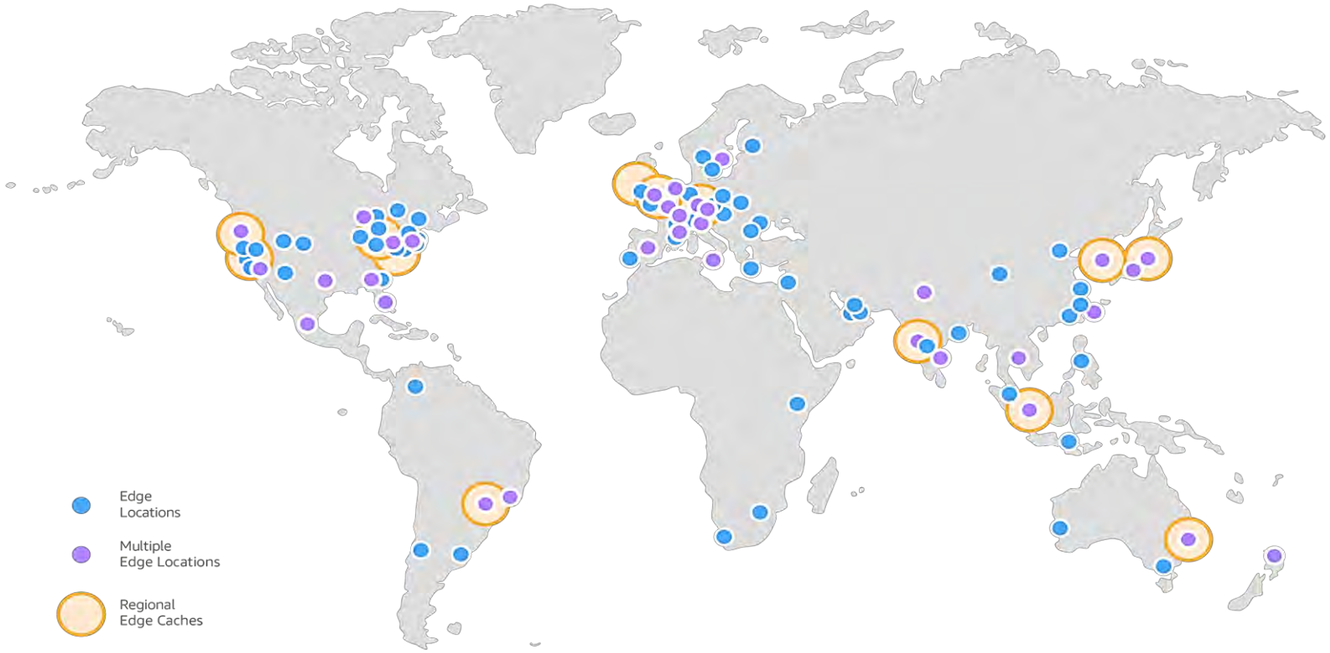
Regions, Availability Zones, and Edge Locations

Availability Zones

- Each Region is made up of two or more Availability Zones.
- An Availability Zone is simply a data center with redundant power, networking, and connectivity, located within the same Region.

Regions, Availability Zones, and Edge Locations

Edge Locations



- Edge Locations are endpoints for AWS CloudFront, which is a content delivery network (CDN) that securely delivers data, videos, applications, and APIs to customers globally with low latency, high transfer speeds, all within a developer-friendly environment.

Benefits of using Regions and Availability Zones

- **Highly Available**
- **Scalable and Flexible**
- **Cost-Effective**
- **Secure**

Understanding Regions

Discover everything you need to know about AWS regions. From their purpose to how to choose the right one, this presentation will take you on a journey through AWS' global infrastructure.

What are AWS Regions?

AWS infrastructure

- Regions are physical locations where AWS has a presence.
- This presence includes data centers and other AWS services.

Region independence

- Regions operate independently from each other, which means that they have their own endpoints and individual availability zones.

What are AWS Regions?

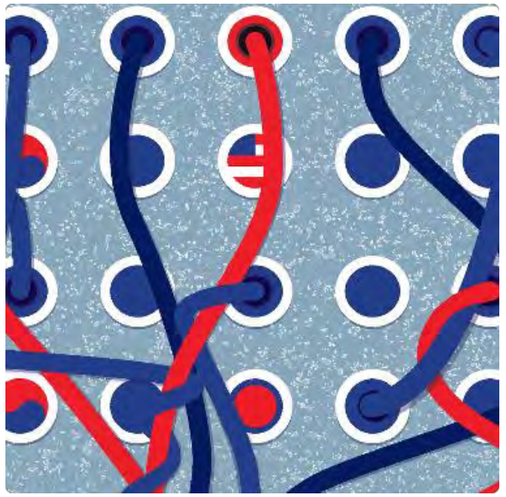
Regional services

- Each region offers a specific range of services, which can vary depending on the region's location or local regulations.

Global network

- AWS regions are connected through a global network that provides low latency and high throughput connections between regions and services.

Why Choosing the Right Region is Crucial



Latency

Legal requirements

Resilience

AWS Coverage Around the Globe

1

The Americas

AWS has multiple regions serving Canada, the United States, and South America, including Brazil and Argentina.

2

EMEA

AWS has strong coverage in Europe, the Middle East, and Africa, with regions in Ireland, Frankfurt, London, and more.

3

Asia Pacific

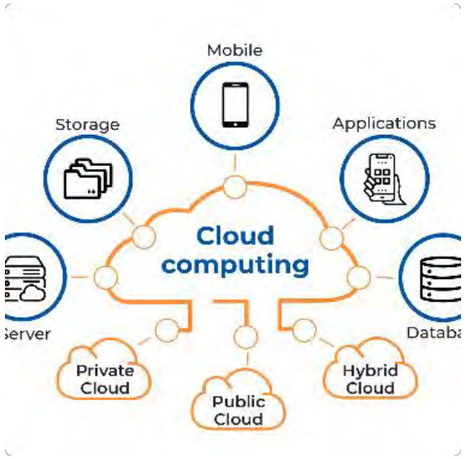
AWS has several regions in the Asia Pacific area, including China, India, and Australia, and is expanding in the region with new facilities.

Factors to Consider When Selecting a Region

1. Workload location
2. Service availability
3. Regulation and compliance
4. Disaster recovery

Architecting for Resilience

Resilience in the Cloud

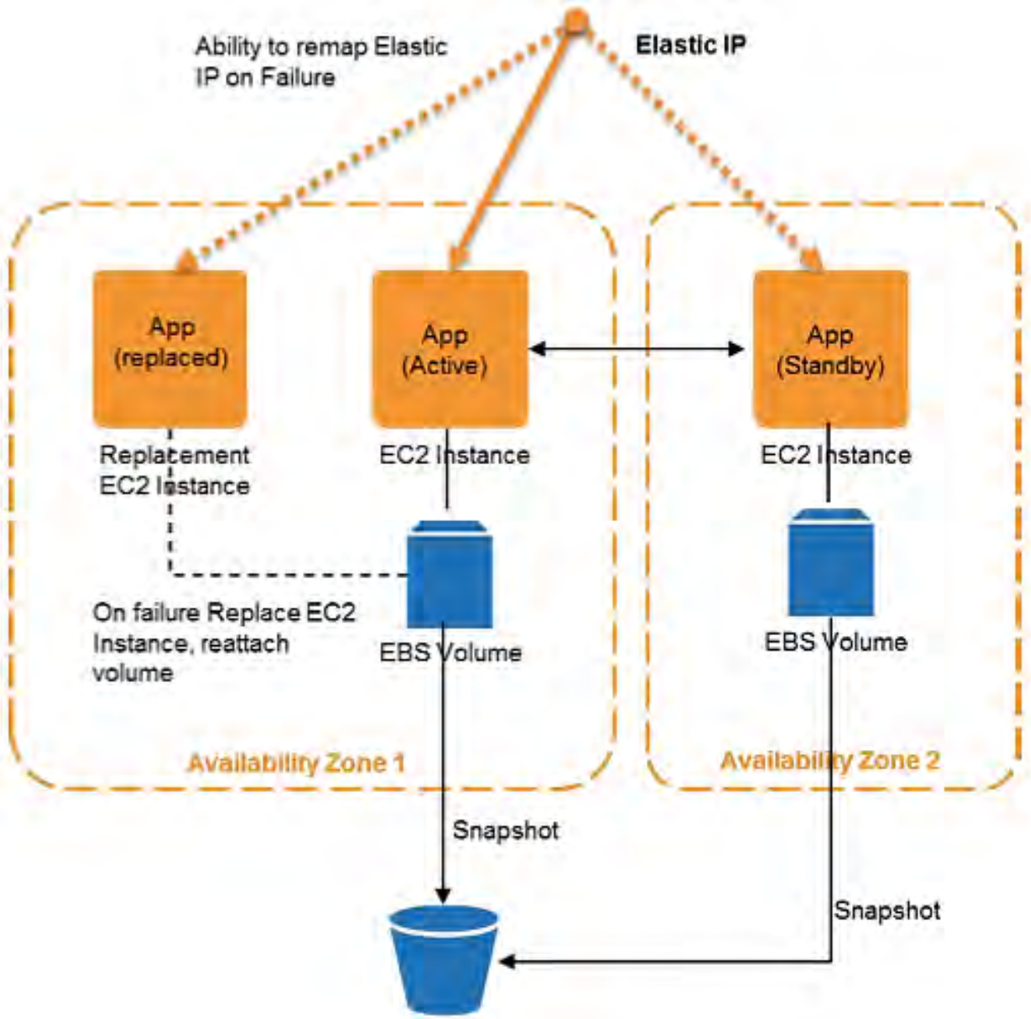


Cloud computing

Security

Connectivity

Fault-Tolerant Applications



Design Strategies for Fault-Tolerant Applications

Strategy	Description	Advantages
Decoupling	Components operate independently.	More resilient against individual component failure.
Redundancy	Multiple copies of components.	Protects against hardware or software failures.
Automated recovery	Automatically recover from failures.	Minimizes downtime and human error.

Case Studies of Highly Available Architectures

Streaming

Netflix's Chaos Monkey, which randomly shuts down components to test system resilience.

1

DNS

Route 53 for global traffic routing with failover to a second region.

2

3

Financial Services

JPMorgan Chase using AWS for their high performance, low-latency applications.

Best Practices for Architecting for Resilience

Testing

- Test for failures and unexpected behavior.

Redundancy

- Have backups for critical components.

Automation

- Automate where feasible for faster recovery times and fewer human errors.

Edge Locations and Their Significance

What are Edge Locations?

- Edge locations are servers that are geographically closer to the end-user, allowing for faster content delivery and lower latency.

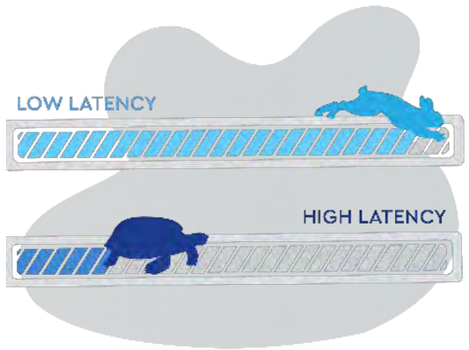
The Purpose of Edge Locations

- Edge locations help to reduce latency and improve the user experience by caching content closer to the end-user.

Enhanced Content Delivery and Reduced Latency

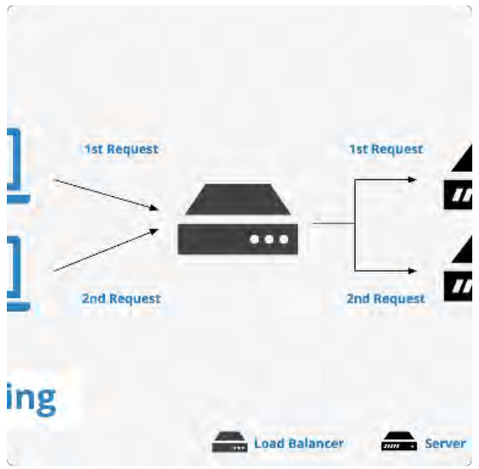
Content Delivery Networks (CDNs)

CDNs use edge locations to store cached versions of content, reducing the distance between the user and the server.



Reduced Latency

Edge locations help to reduce latency by bringing computing closer to the end-user, bypassing the traditional cloud infrastructure.



Load Balancing

Edge locations can also be used for load balancing, directing traffic to the most efficient server based on the user's location.

Benefits of Edge Computing

- Increased Security
- Improved Reliability
- Cost Savings
- Reduced latency/increased speed
- Increased productivity

Real-World Case Studies of Edge Computing

Retail

A major retail company uses edge computing to improve their inventory management system in their physical stores.

- Edge computing allows for faster data processing of inventory data on local devices
- Eliminates the need for constant communication to a centralized server
- Reduces the risk of network congestion and device failure

Manufacturing

A manufacturing company optimizes their production line with edge computing.

- Edge devices monitor machine performance and identify inefficiencies in real-time
- Critical data is processed locally, reducing the risk of system failure or loss of data
- Allows for predictive maintenance, reducing downtime and improving overall efficiency