



# AWS Cloud Practitioner Essentials

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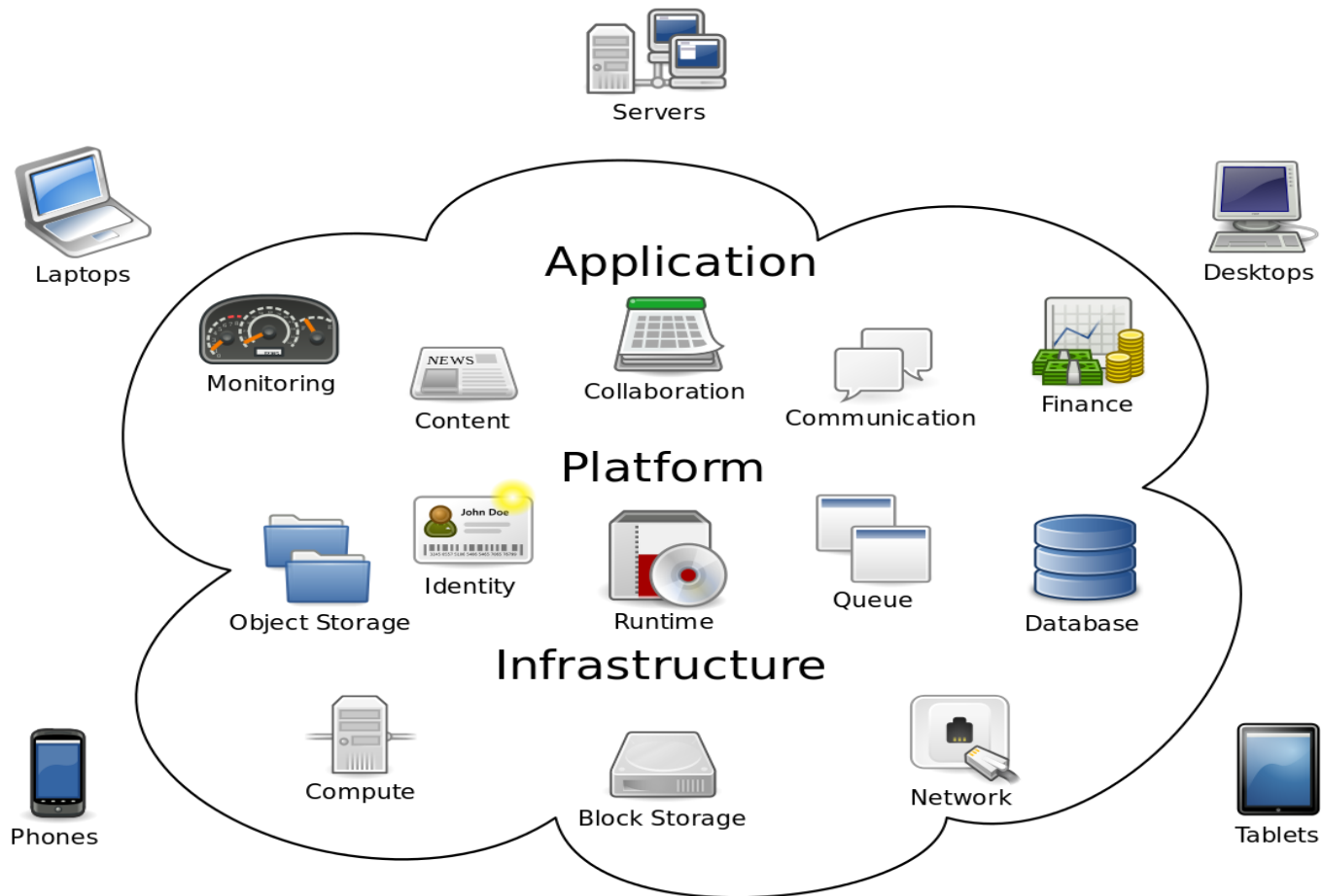
# Module 2: Introduction AWS

- » What is “Cloud Computing”?
- » AWS Reference Model
- » AWS Shared Responsibility Model
- » AWS Training & Certification
- » Getting Started With AWS

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# **What is Cloud Computing?**



# Cloud computing

Cloud computing is the on-demand delivery of compute power, database storage, applications, and other IT resources through a cloud services platform via the internet with pay-as-you-go pricing.

# What Exactly Is Amazon Web Service?

Amazon Web Services is a secure cloud services platform with over 100 different services that include solutions.

## Explore Our Products



Database



Migration



Security, Identity & Compliance



Analytics



Messaging



Business



Game Development



Product Center

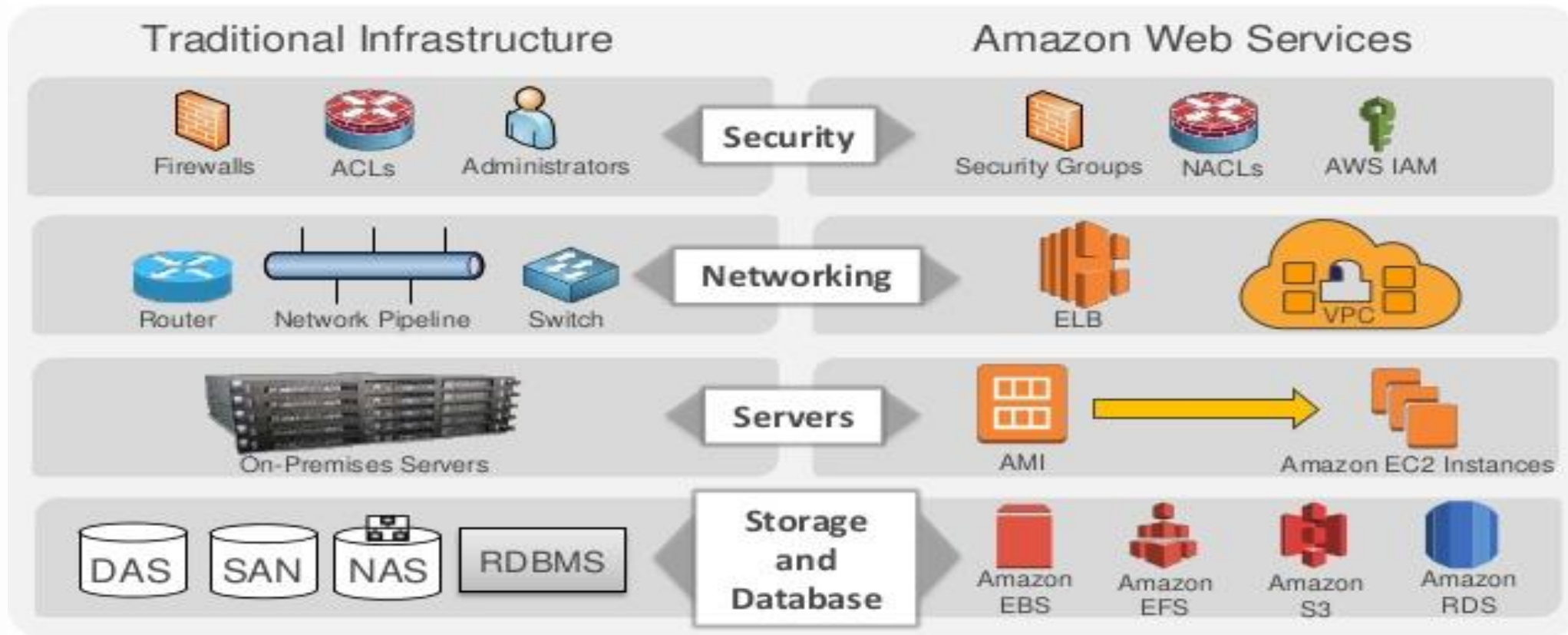
Tools

Services



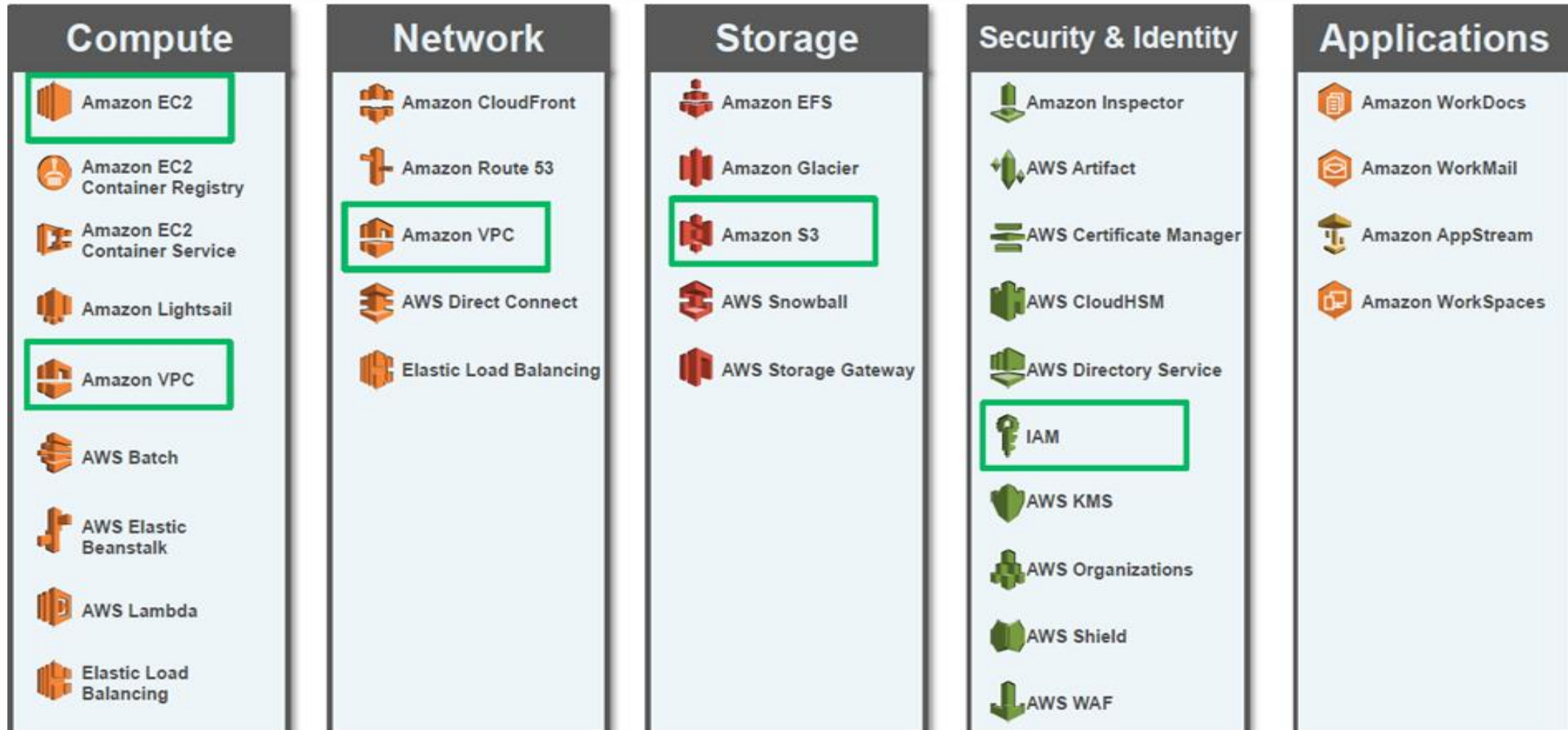
# Traditional Infrastructure & Amazon Web Service

## AWS Core Infrastructure and Services



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# AWS Foundation Service









# AWS Service

## Amazon Web Services





### Compute

-  **EC2**  
Virtual Servers in the Cloud
-  **EC2 Container Service**  
Run and Manage Docker Containers
-  **Elastic Beanstalk**  
Run and Manage Web Apps
-  **Lambda**  
Run Code in Response to Events




### Storage & Content Delivery

-  **S3**  
Scalable Storage in the Cloud
-  **CloudFront**  
Global Content Delivery Network
-  **Elastic File System** **PREVIEW**  
Fully Managed File System for EC2
-  **Glacier**  
Archive Storage in the Cloud
-  **Import/Export Snowball**  
Large Scale Data Transport
-  **Storage Gateway**  
Integrates On-Premises IT Environments with Cloud Storage

### Database

-  **RDS**  
Managed Relational Database Service
-  **DynamoDB**  
Predictable and Scalable NoSQL Data Store
-  **ElastiCache**  
In-Memory Cache
-  **Redshift**  
Managed Petabyte-Scale Data Warehouse Service








### Networking

-  **VPC**  
Isolated Cloud Resources
-  **Direct Connect**  
Dedicated Network Connection to AWS
-  **Route 53**  
Scalable DNS and Domain Name Registration





### Developer Tools

-  **CodeCommit**  
Store Code in Private Git Repositories
-  **CodeDeploy**  
Automate Code Deployments
-  **CodePipeline**  
Release Software using Continuous Delivery





### Management Tools

-  **CloudWatch**  
Monitor Resources and Applications
-  **CloudFormation**  
Create and Manage Resources with Templates
-  **CloudTrail**  
Track User Activity and API Usage
-  **Config**  
Track Resource Inventory and Changes
-  **OpsWorks**  
Automate Operations with Chef
-  **Service Catalog**  
Create and Use Standardized Products
-  **Trusted Advisor**  
Optimize Performance and Security

### Security & Identity

-  **Identity & Access Management**  
Manage User Access and Encryption Keys
-  **Directory Service**  
Host and Manage Active Directory
-  **Inspector** **PREVIEW**  
Analyze Application Security
-  **WAF**  
Filter Malicious Web Traffic






### Analytics

-  **EMR**  
Managed Hadoop Framework
-  **Data Pipeline**  
Orchestration for Data-Driven Workflows
-  **Elasticsearch Service**  
Run and Scale Elasticsearch Clusters
-  **Kinesis**  
Work with Real-time Streaming data








### Internet of Things

-  **AWS IoT** **BETA**  
Connect Devices to the cloud


### Mobile Services

-  **Mobile Hub** **BETA**  
Build, Test, and Monitor Mobile apps
-  **Cognito**  
User Identity and App Data Synchronization
-  **Device Farm**  
Test Android, Fire OS, and iOS apps on real devices in the Cloud
-  **Mobile Analytics**  
Collect, View and Export App Analytics
-  **SNS**  
Push Notification Service

### Application Services

-  **API Gateway**  
Build, Deploy and Manage APIs
-  **AppStream**  
Low Latency Application Streaming
-  **CloudSearch**  
Managed Search Service
-  **Elastic Transcoder**  
Easy-to-use Scalable Media Transcoding
-  **SES**  
Email Sending Service
-  **SQS**  
Message Queue Service
-  **SWF**  
Workflow Service for Coordinating Application Components

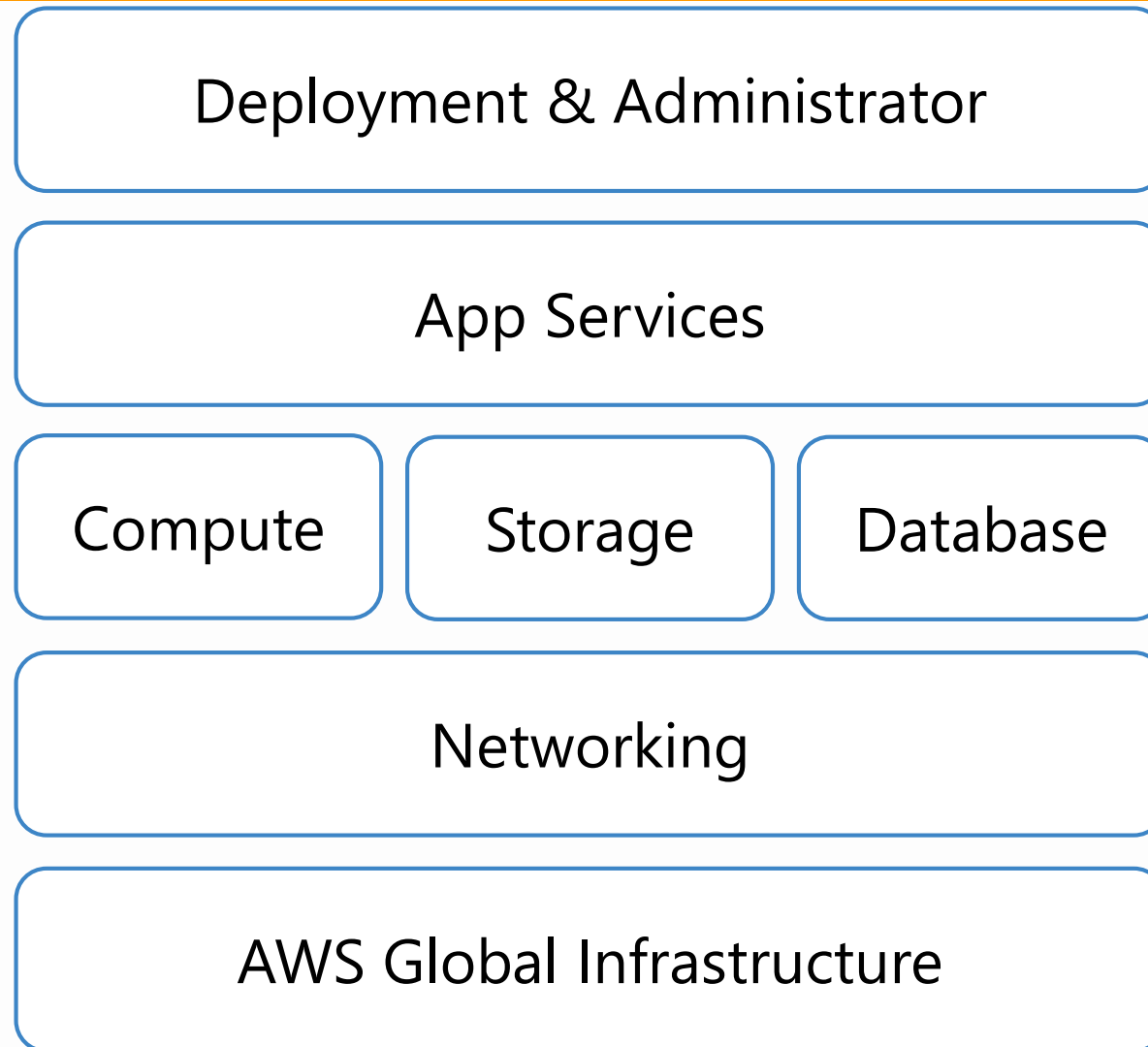
### Enterprise Applications

-  **WorkSpaces**  
Desktops in the Cloud
-  **WorkDocs**  
Secure Enterprise Storage and Sharing Service
-  **WorkMail** **PREVIEW**  
Secure Email and Calendaring Service



# **AWS Reference Model**

# AWS Reference Model





# AWS Global Infrastructure

Deployment & Administrator

App Services

Compute

Storage

Database

Networking

AWS Global Infrastructure

## Data Center:

A single data center typically houses several thousands of servers.

## Availability Zone:

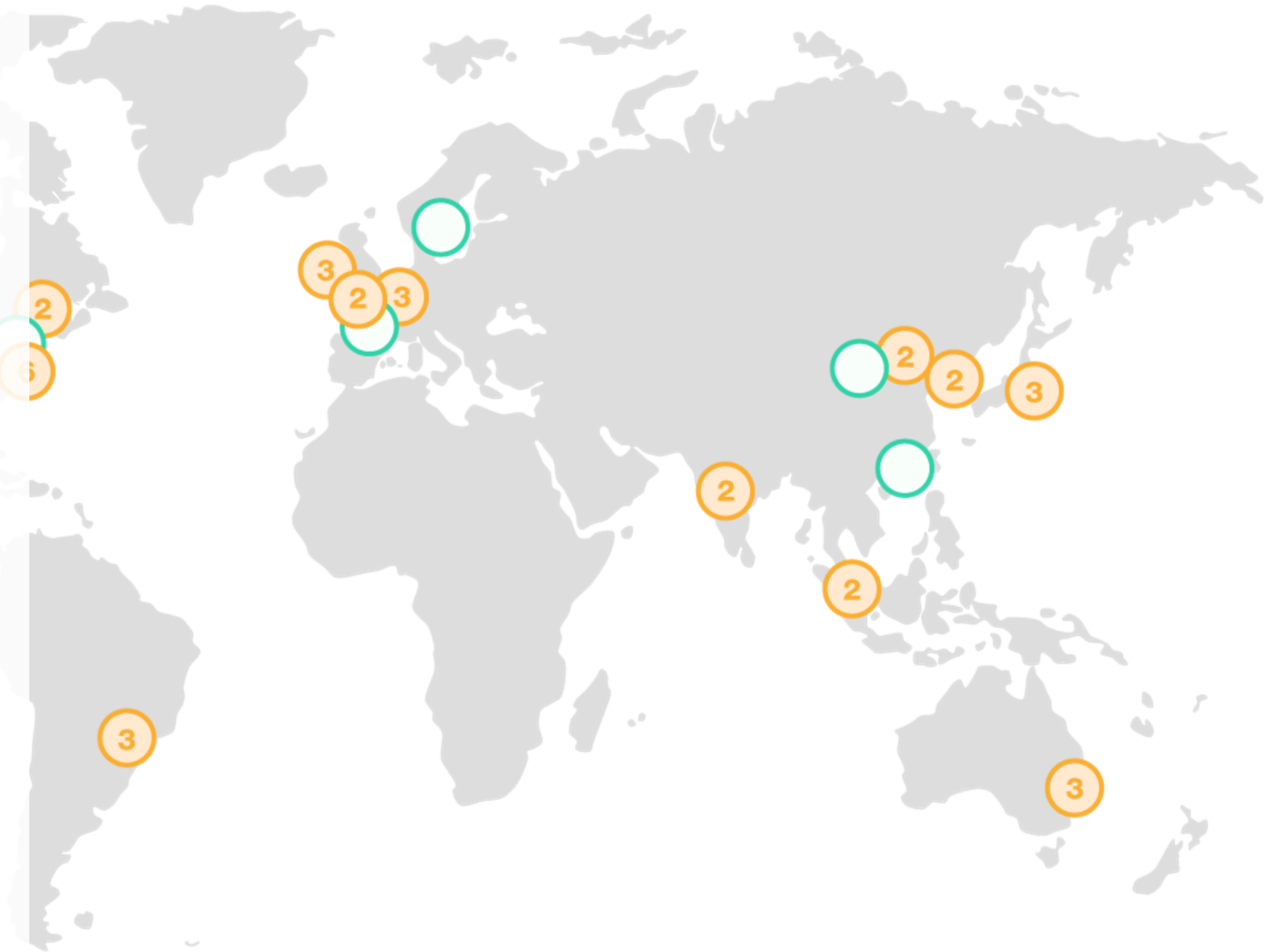
Availability Zones consist of one or more discrete data centers, each with redundant power, networking and connectivity, housed in separate facilities.

## Regions:

A Region is a physical location in the world where we have multiple Availability Zones. Communication between regions uses public Internet Infrastructure.

# AWS Global Infrastructure

The AWS Cloud spans 84 Availability Zones within 26 geographic regions around the world, with announced plans for 24 more Availability Zones and 8 more AWS Regions in Australia, Canada, India, Israel, New Zealand, Spain, Switzerland, and United Arab Emirates (UAE).



# AWS Global Infrastructure



## Region & Number of Availability Zones

### US East

N. Virginia (6),  
Ohio (3)

### US West

N. California (3),  
Oregon (4)

### Asia Pacific

Mumbai (2),  
Seoul (2),  
Singapore (3),  
Sydney (3),  
Tokyo (4),  
Osaka-Local (1)<sup>1</sup>

### Canada

Central (2)

### China

Beijing (2),  
Ningxia (3)

### Europe

Frankfurt (3),  
Ireland (3),  
London (3),  
Paris (3),  
Stockholm (3)

### South America

São Paulo (3)

### GovCloud (US)

US-East (3),  
US-West (3)

### 26 Launched Regions

Each with multiple Availability Zones  
(AZ's)

### 2x More Regions

With multiple AZ's than the next  
largest cloud provider

### 84 Availability Zones

### 245 Countries and Territories Served

### 17 Local Zones

### 24 Wavelength Zones

For ultralow latency applications

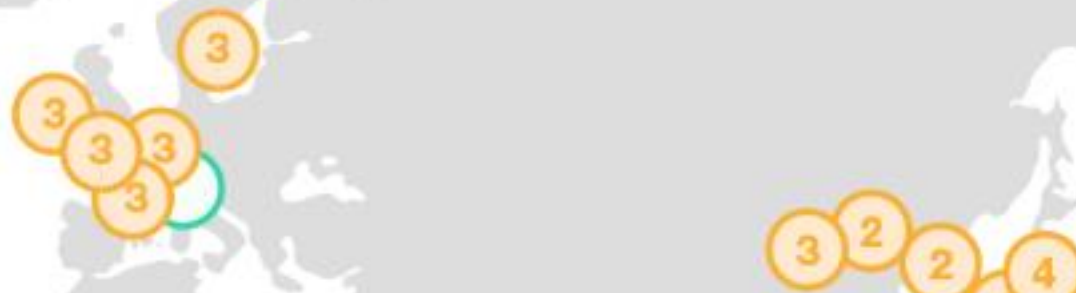
### 108 Direct Connect Locations

### 8 Announced Regions

### 32 Announced Local Zones

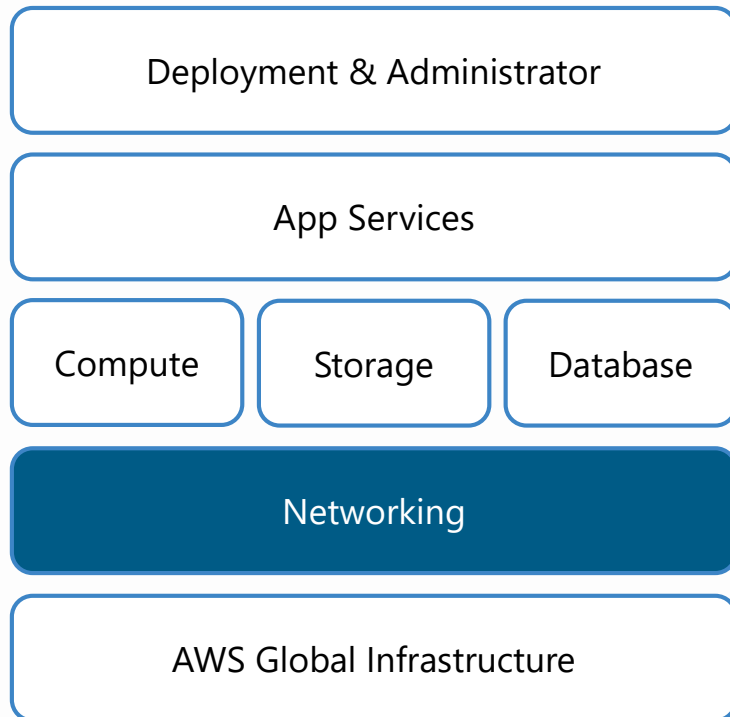
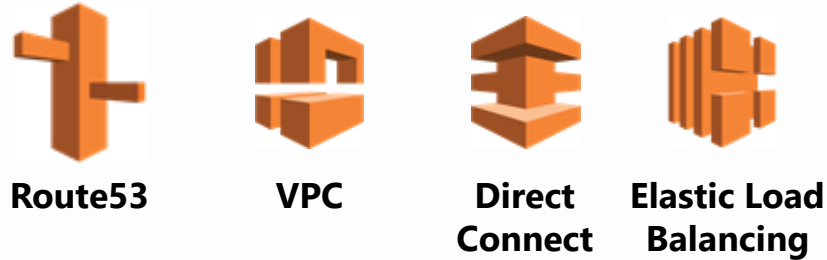
### 310+ Points of Presence

300+ Edge Locations and 13 Regional  
Edge Caches





# Networking



- **Virtual Private Cloud:**

a logically isolated section of the Amazon Web Services (AWS) cloud where you can launch AWS resources in a virtual network that you define.

- **Direct connect:**

dedicated network connection from your premises to AWS.

- **Elastic Load balancing:**

Elastic Load Balancing distributes incoming application traffic across multiple EC2 instances, in multiple Availability Zones. This increases the fault tolerance of your applications.

- **AWS Route 53**

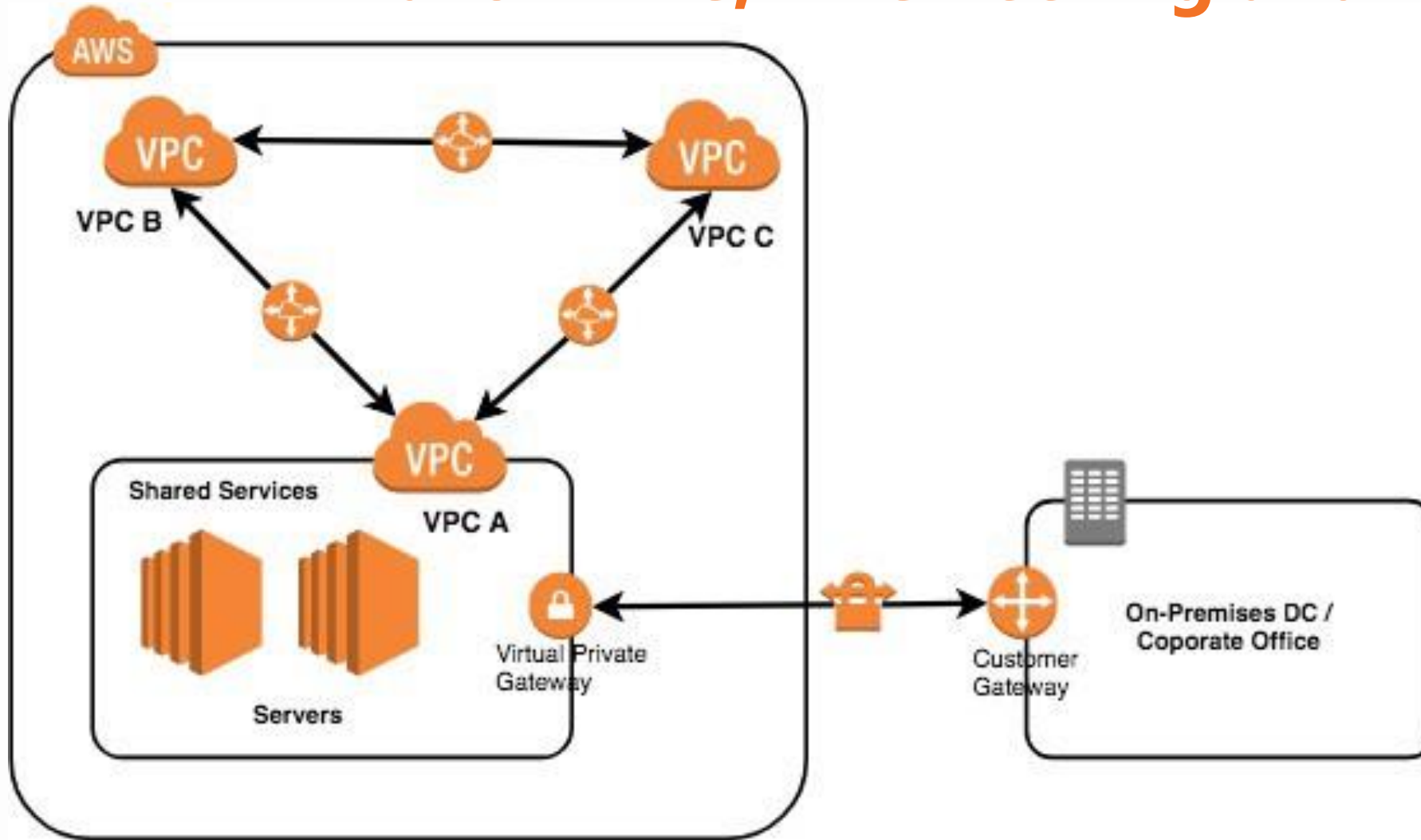
Route end users to internet applications

Answers DNS queries with low latency by using a global network of DNS servers

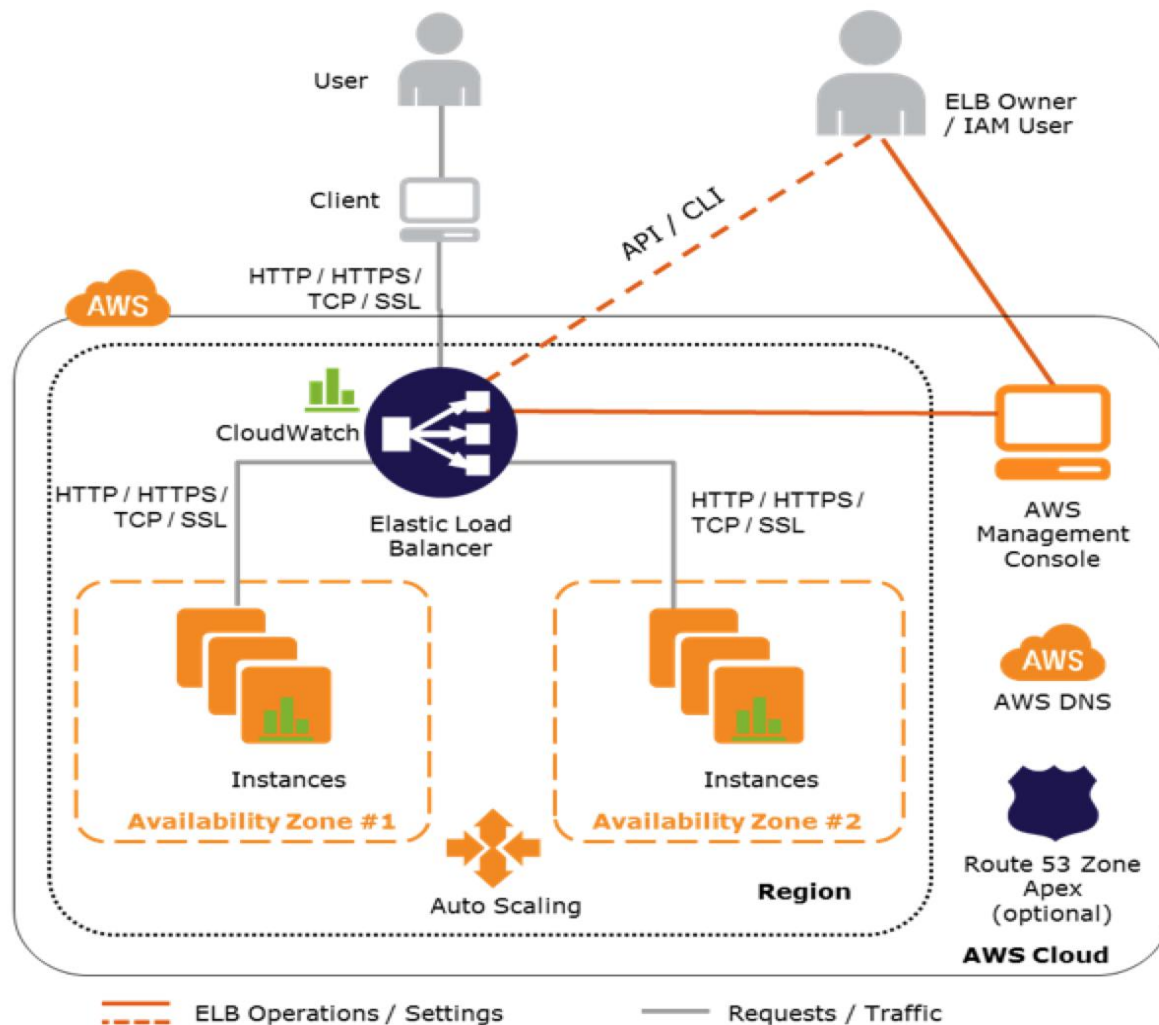
Provides health-checks to route traffic to healthy endpoint

Offers Domain Name Registration

## Amazon VPC, VPC Peering and VPN



# Networking



- **Elastic Load Balancing**

Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances.

Elastic Load Balancing supports two types of load balancers: Application Load Balancers and Classic Load Balancers. Choose the load balancer type that meets your needs.

### Benefit

- Available
- Elastic
- Secure

# Compute



EC2



Auto  
Scaling



Lambda

Deployment & Administrator

App Services

Compute

Storage

Database

Networking

AWS Global Infrastructure

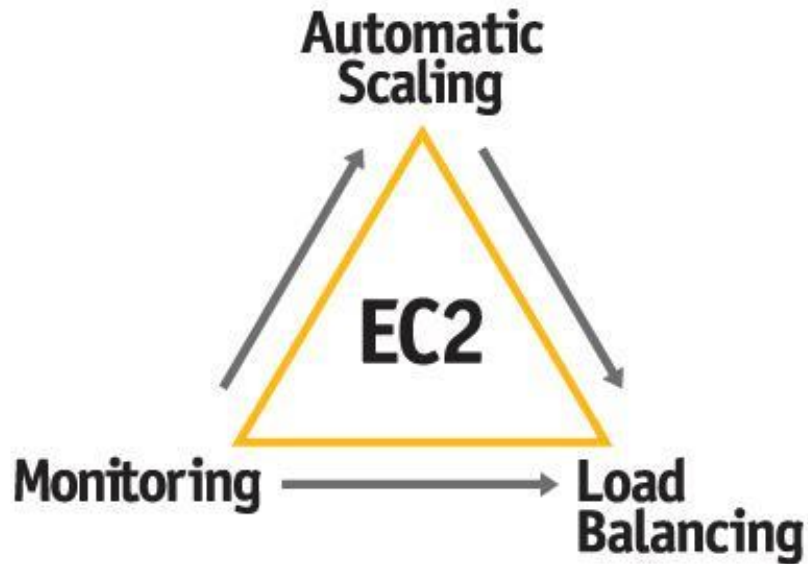
- **Elastic Compute Cloud (EC2):**  
a web service that provides secure, resizable compute capacity in the cloud.
- **Auto Scaling:**  
Automatically launch or terminate EC2 instances based on user-defined policies, health status checks, and schedules
- **Lambda:**  
AWS Lambda is a zero-administration compute platform for back-end web developers that runs your code for you in the AWS [cloud](#) and provides you with a fine-grained pricing structure.

- **Elastic Compute Cloud**

Ec2 offers Virtual computing Environment (Instances) you can launch and manage with a few clicks of mouse or few lines of code.

**Benefit:**

- Elastic Web-Scale Computing ,Completely Controlled
- Flexible Cloud Hosting Services , Integrated
- Reliable ,Secure
- Inexpensive
- Easy to Start





# EC2 pricing option



## EC2 – Pricing Model

### On-Demand **Least Commitment**

- low cost and flexible
- only pay per hour
- short-term, spiky, unpredictable workloads
- cannot be interrupted
- For first time apps

### Spot upto 90% **Biggest Savings**

- request spare computing capacity
- flexible start and end times
- Can handle interruptions (server randomly stopping and starting)
- For non-critical background jobs

### Reserved upto 75% off **Best Long-term**

- steady state or predictable usage
- commit to EC2 over a 1 or 3 year term
- Can resell unused reserved instances

### Dedicated **Most Expensive**

- Dedicated servers
- Can be on-demand or reserved (upto 70% off)
- When you need a guarantee of isolate hardware (enterprise requirements)

# EC2 Pricing

## Fundamental

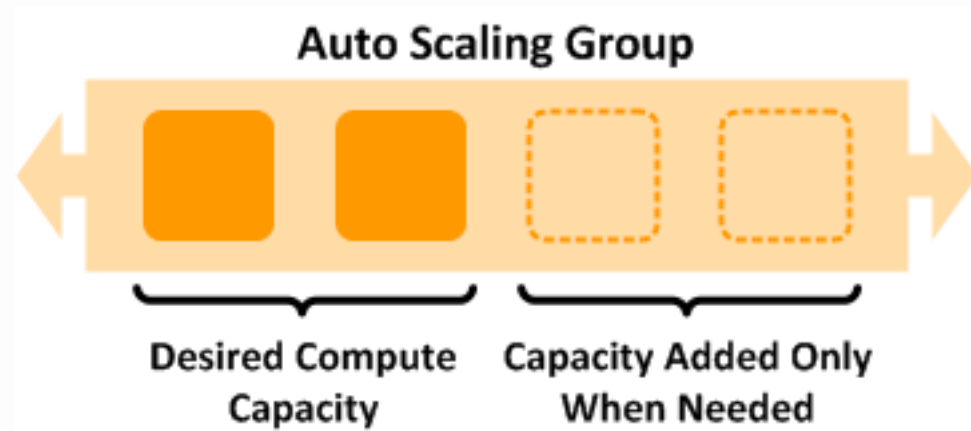
- Compute:
  - Clock hour of server time
- instance type
- purchase type
- OS and software package
- Block storage
  - additional storage, backup, data transfer
- Load balancing
- data processing
- detailed monitoring
- EIP
- Data transfer
- Regional data transfer
- data transfer out

## Auto scaling

Auto Scaling helps you maintain application availability and allows you to dynamically scale your [Amazon EC2](#) capacity up or down automatically according to conditions you define. When you use Auto Scaling, your applications gain the following

### Benefits:

- Better fault tolerance.
- Better availability.
- Better cost management.



# Storage



Deployment & Administrator

App Services

Compute

Storage

Database

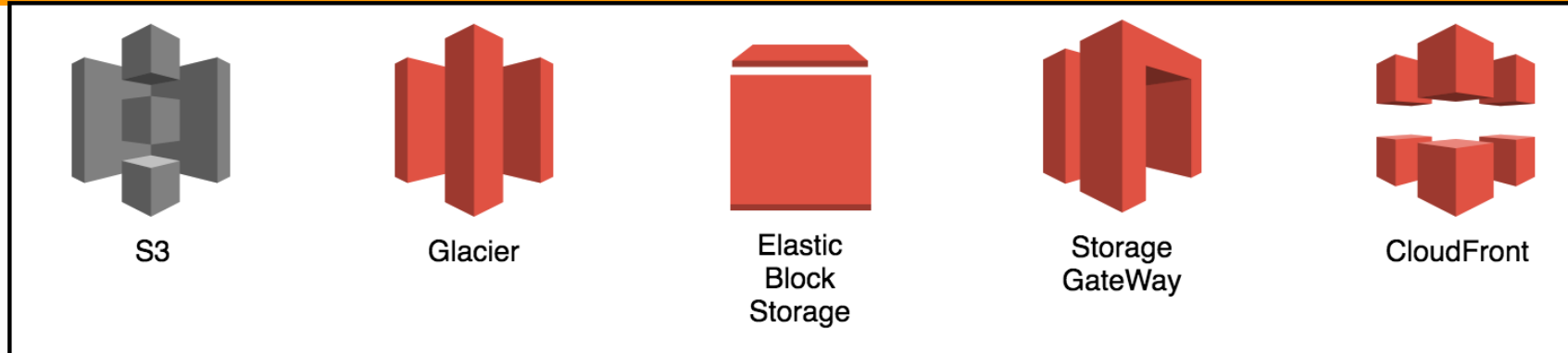
Networking

AWS Global Infrastructure

## AWS Cloud Storage Products

If You Need:	Consider Using:
Persistent local storage for Amazon EC2, for relational and NoSQL databases, data warehousing, enterprise applications, Big Data processing, or backup and recovery	<a href="#">Amazon Elastic Block Store (Amazon EBS)</a>
A simple, scalable, elastic file system for Linux-based workloads for use with AWS Cloud services and on-premises resources. It is built to scale on demand to petabytes without disrupting applications, growing and shrinking automatically as you add and remove files, so your applications have the storage they need – when they need it.	<a href="#">Amazon Elastic File System (Amazon EFS)</a>
A fully managed file system that is optimized for compute-intensive workloads, such as high performance computing, machine learning, and media data processing workflows, and is seamlessly integrated with Amazon S3	<a href="#">Amazon FSx for Lustre</a>
A fully managed native Microsoft Windows file system built on Windows Server so you can easily move your Windows-based applications that require file storage to AWS, including full support for the SMB protocol and Windows NTFS, Active Directory (AD) integration, and Distributed File System (DFS).	<a href="#">Amazon FSx for Windows File Server</a>
A scalable, durable platform to make data accessible from any Internet location, for user-generated content, active archive, serverless computing, Big Data storage or backup and recovery	<a href="#">Amazon Simple Storage Service (Amazon S3)</a>
Highly affordable long-term storage that can replace tape for archive and regulatory compliance	<a href="#">Amazon Glacier</a>
A hybrid storage cloud augmenting your on-premises environment with Amazon cloud storage, for bursting, tiering or migration	<a href="#">AWS Storage Gateway</a>
A portfolio of services to help simplify and accelerate moving data of all types and sizes into and out of the AWS cloud	<a href="#">Cloud Data Migration Services</a>
A fully managed backup service that makes it easy to centralize and automate the back up of data across AWS services in the cloud as well as on premises using the AWS Storage Gateway.	<a href="#">AWS Backup</a>

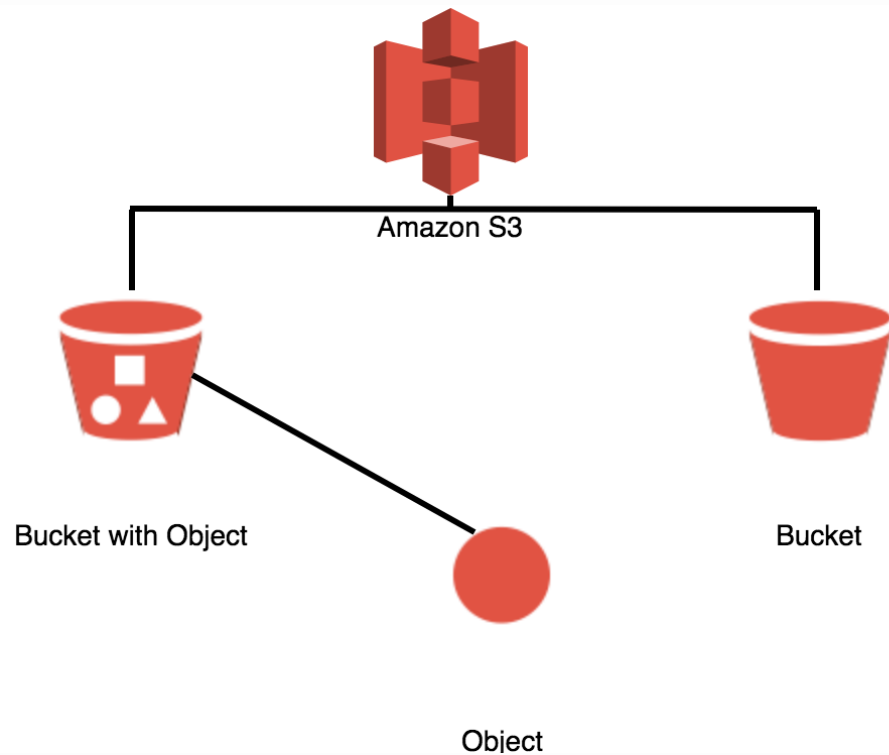
# Amazon Simple Storage Service (S3)



- Storage for the Internet
- Natively online, HTTP access
- Store and retrieve any amount of data, any time, from anywhere on the web
- High Scalable, reliable, fast and durable



# Amazon Simple Storage Service (S3)



- Amazon S3 stores data as objects within buckets.
- An object is comprised of a file and Optionally any metadata that describes that file
- You can have up to 100 buckets in each account
- You can control access to the bucket and its objects

# Amazon S3 Storage Classes

- **General Purpose**

Amazon S3 Standard

Amazon S3 Standard offers high durability, availability, and performance object storage for frequently accessed data.

# Amazon S3 Storage Classes

- **Unknown or changing access**

Amazon S3 Intelligent-Tiering (S3 Intelligent-Tiering) — NEW

The S3 Intelligent-Tiering storage class is designed to optimize costs by automatically moving data to the most cost-effective access tier, without performance impact or operational overhead

# Amazon S3 Storage Classes

- **Infrequent Access**

## Amazon S3 Standard - Infrequent Access (Standard - IA)

S3 Standard-IA is for data that is accessed less frequently, but requires rapid access when needed. S3 Standard-IA offers the high durability, high throughput, and low latency of S3 Standard

## Amazon S3 One Zone-Infrequent Access (S3 One Zone-IA)

S3 One Zone-IA stores data in a single AZ and costs 20% less than S3 Standard-IA.

# Amazon S3 Storage Classes

## **Archive**

### Amazon Glacier

Amazon Glacier is a secure, durable, and extremely low-cost storage service for data archiving.

Amazon S3 Glacier Deep Archive (S3 Glacier Deep Archive)  
COMING SOON



## Performance across the S3 Storage Classes

	S3 Standard	S3 Intelligent-Tiering*	S3 Standard-IA	S3 One Zone-IA†	S3 Glacier	S3 Glacier Deep Archive**
Designed for durability	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)
Designed for availability	99.99%	99.9%	99.9%	99.5%	99.99%	99.99%
Availability SLA	99.9%	99%	99%	99%	99.9%	99.9%
Availability Zones	≥3	≥3	≥3	1	≥3	≥3
Minimum capacity charge per object	N/A	N/A	128KB	128KB	40KB	40KB
Minimum storage duration charge	N/A	30 days	30 days	30 days	90 days	180 days
Retrieval fee	N/A	N/A	per GB retrieved	per GB retrieved	per GB retrieved	per GB retrieved
First byte latency	milliseconds	milliseconds	milliseconds	milliseconds	select minutes or hours	select hours
Storage type	Object	Object	Object	Object	Object	Object
Lifecycle transitions	Yes	Yes	Yes	Yes	Yes	Yes

# S3 Pricing Fundamental

Storage pricing

Request pricing

S3 Storage Management  
pricing

Data Transfer pricing

S3 Transfer Acceleration  
pricing

Cross-Region Replication  
pricing

AWS GovCloud Region

# Storage



S3



Glacier



Elastic  
Block  
Storage



Storage  
Gateway



CloudFront

## EBS

Amazon Elastic Block Store (Amazon EBS) provides persistent block storage volumes for use with [Amazon EC2](#) instances in the AWS Cloud.

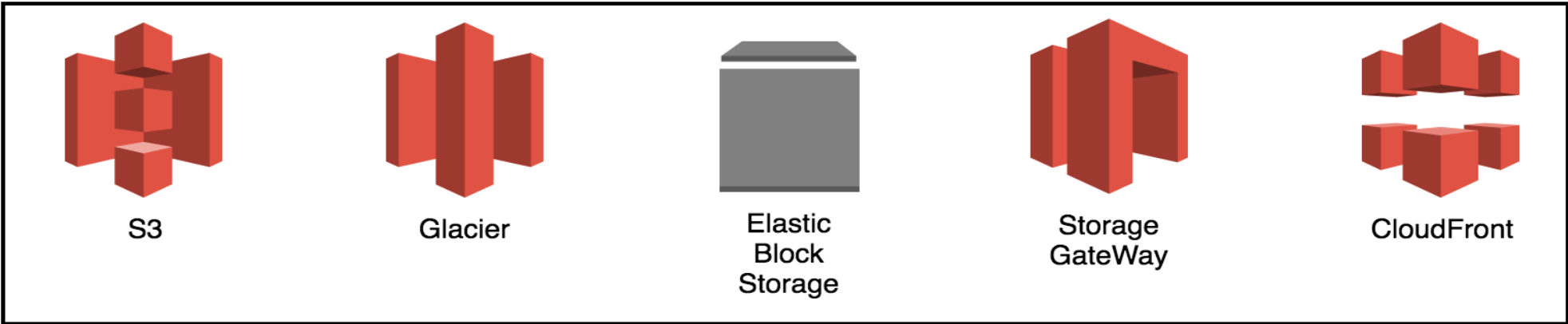
### **Features:**

- High Performance Volumes
- Availability
- Encryption
- Access Management
- Snapshots
- Elastic Volumes

# Amazon EBS Volume Types

	Magnetic	Cold HDD	Throughput Optimized HDD	General Purpose SSD	Provisioned IOPS SSD
Max volume size	1 TiB	16 TiB	16 TiB	16 TiB	16 TiB
Max IOPS/volume	40 to 200	250	500	10,000	20,000
Max throughput/volume	40 to 90 MiB/sec	250 MiB/s	500 MiB/s	160 MiB/sec	320 MiB/sec
Use cases	<ul style="list-style-type: none"> <li>• Infrequent data access</li> </ul>	<ul style="list-style-type: none"> <li>• Workloads involving large, sequential I/O</li> </ul>	<ul style="list-style-type: none"> <li>• Workloads involving large, sequential I/O</li> </ul>	<ul style="list-style-type: none"> <li>• Boot volumes</li> <li>• Small to Medium DBs</li> <li>• Dev and Test environments</li> </ul>	<ul style="list-style-type: none"> <li>• I/O-intensive workloads</li> <li>• Relational DBs</li> <li>• NoSQL DBs</li> </ul>

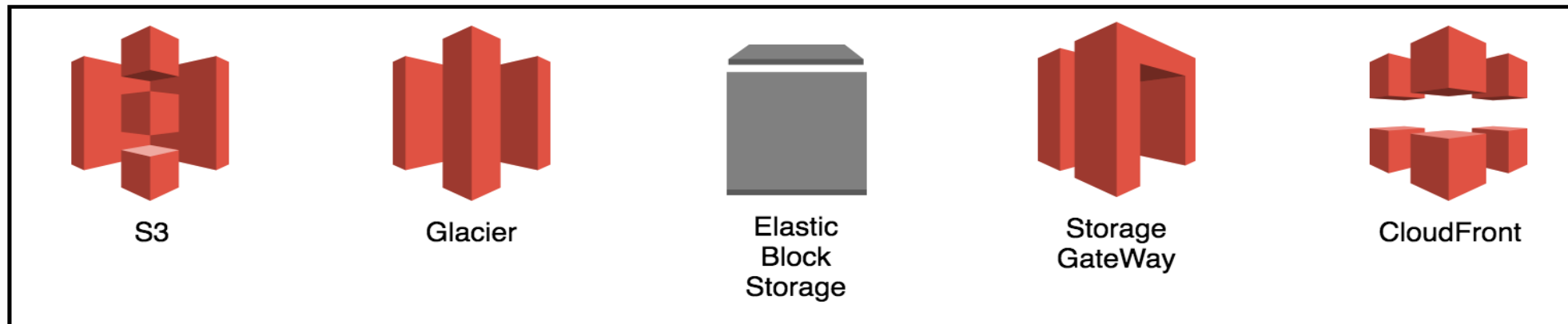
# Amazon EBS Pricing



	Standard	Provisioned IOPS
Storage	\$0.05 per GB-month	\$0.125 per GB-month
IOPS	\$0.05 per 1million I/O requests	\$0.10 per provisioned IOPS-month
Snapshots	0.095 per GB-month of data stored	

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# Amazon EBS Snapshots



- Snapshots are stored in S3
- May be migrated across regions
- New volumes can be created from Amazon EBS Snapshots and places in desired Availability Zone
- AMIs can be created from Amazon EBS Snapshots

# Compare Amazon EBS and Amazon S3

## Amazon EBS and Amazon S3

	Amazon EBS	Amazon S3
<b>Paradigm</b>	Block storage with file system	Object store
<b>Performance</b>	Very fast	Fast
<b>Redundancy</b>	Across multiple servers in an Availability Zone	Across multiple facilities in a Region
<b>Security</b>	EBS Encryption – Data volumes and Snapshots	Encryption
<b>Access from the Internet?</b>	No (1)	Yes (2)
<b>Typical use case</b>	It is a disk drive	Online storage

(1) Accessible from the Internet if mounted to server and set up as FTP, etc.

(2) Only with proper credentials, unless ACLs are world-readable

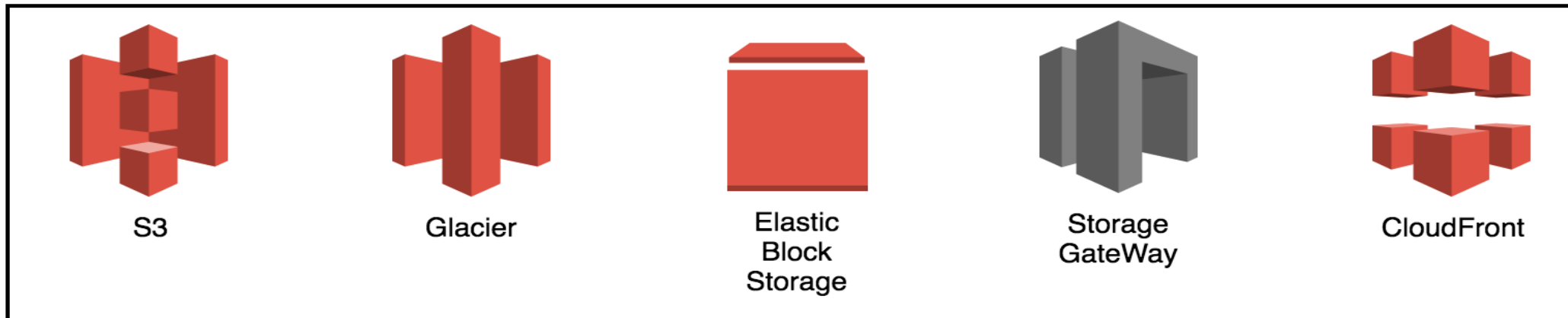
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amazon  
aws.amazon.com  
Training and  
Certification

29

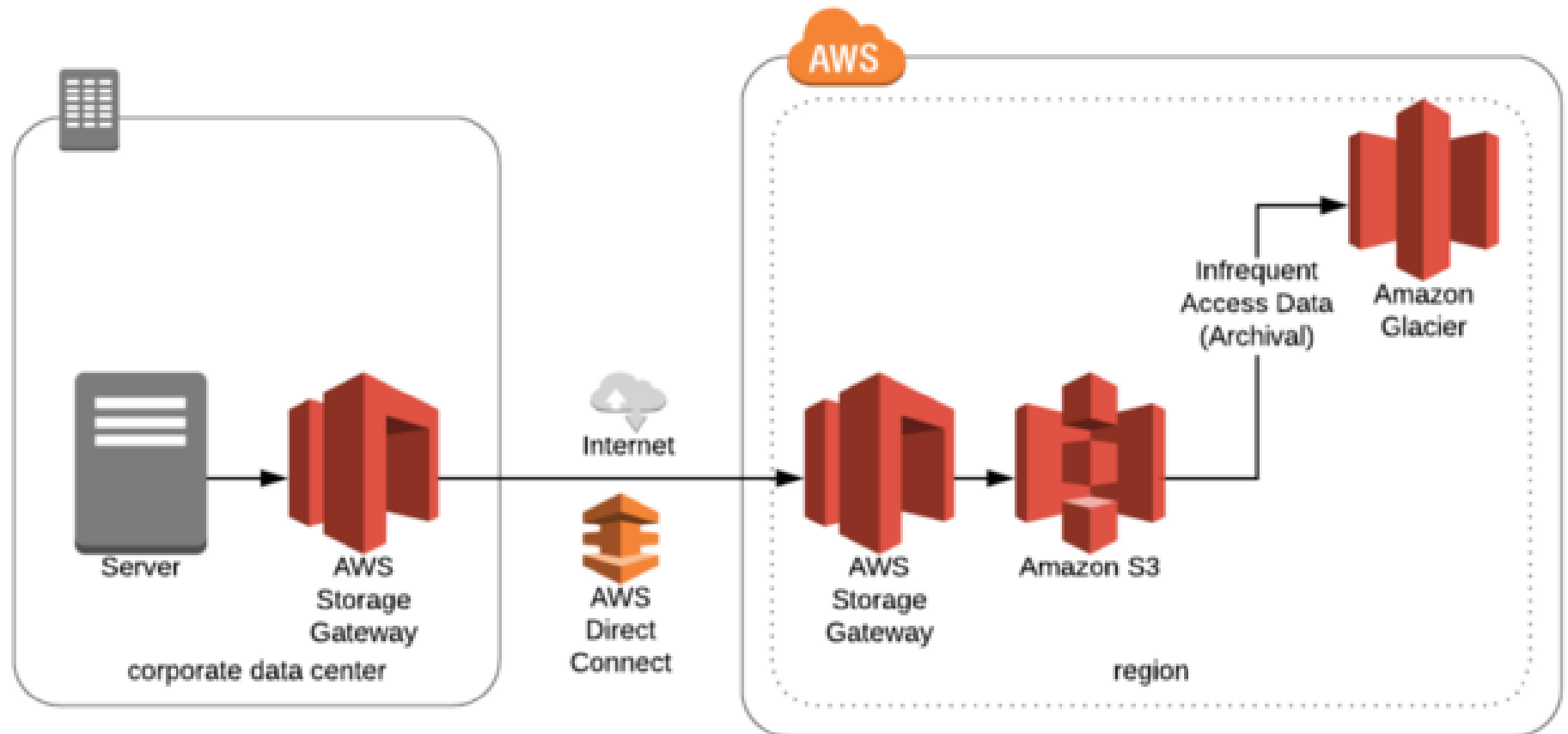


# AWS Storage GateWay



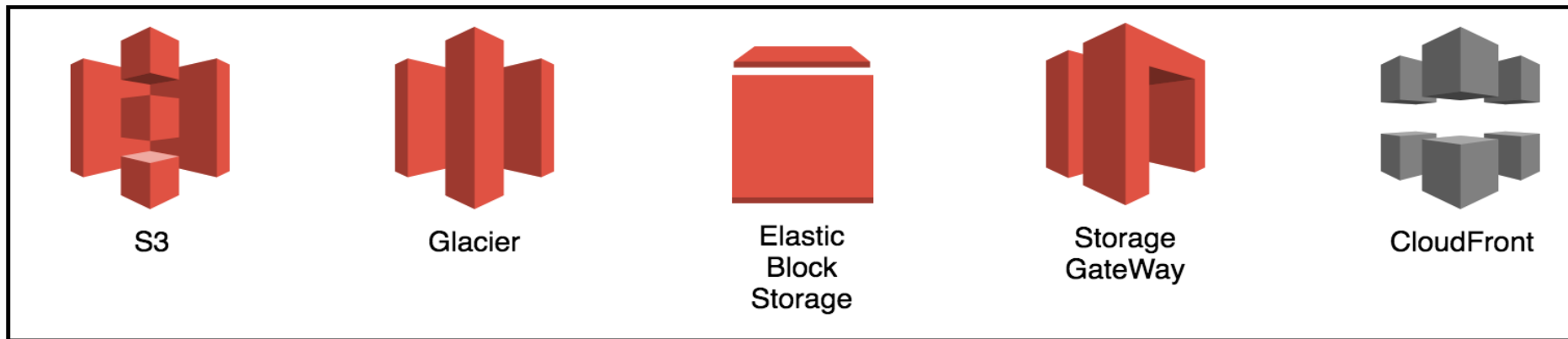
- » Connect an On-premises software appliance with cloud-based storage
- » Securely upload data to the AWS cloud for cost effective backup and rapid disaster recovery
- » Mirror your on-premises data to Amazon EC2 instances

# AWS Storage Gateway



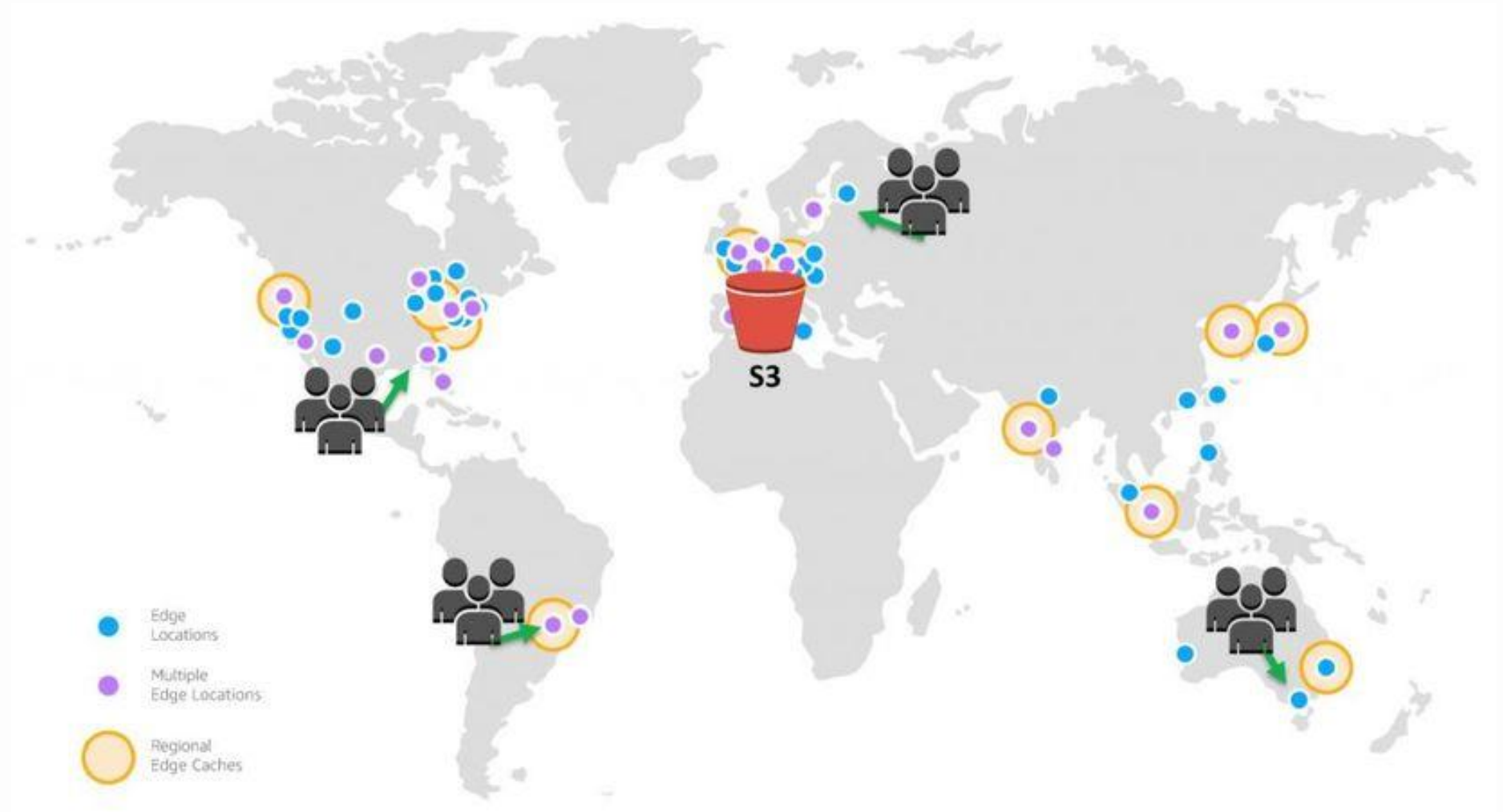
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# Amazon CloudFront



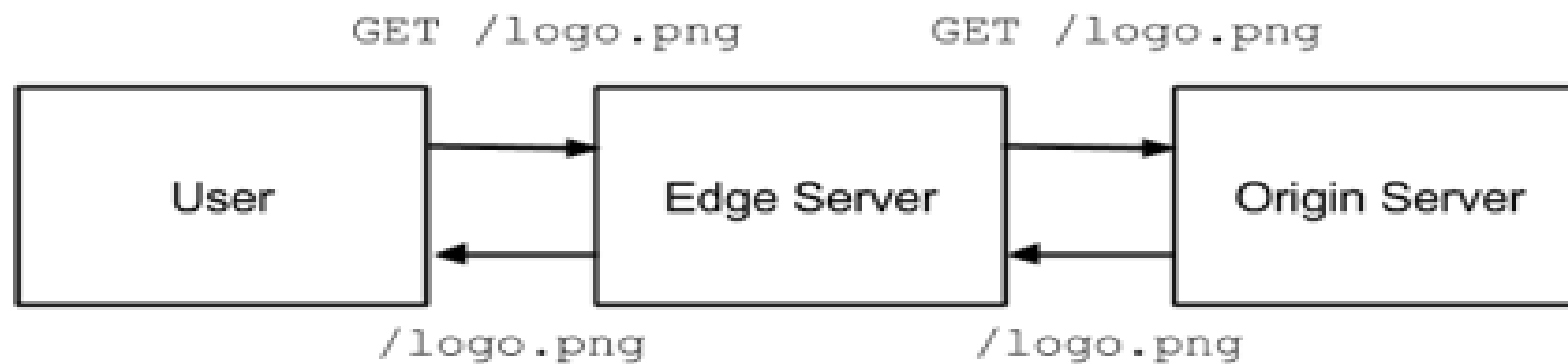
- » Easy and cost effective way to **distribute content** to end users
- » **Low latency, high data transfer speeds**
- » Deliver your entire website, including dynamic, static, streaming, and interactive content using a global network of edge locations

# Amazon CloudFront



# Amazon CloudFront

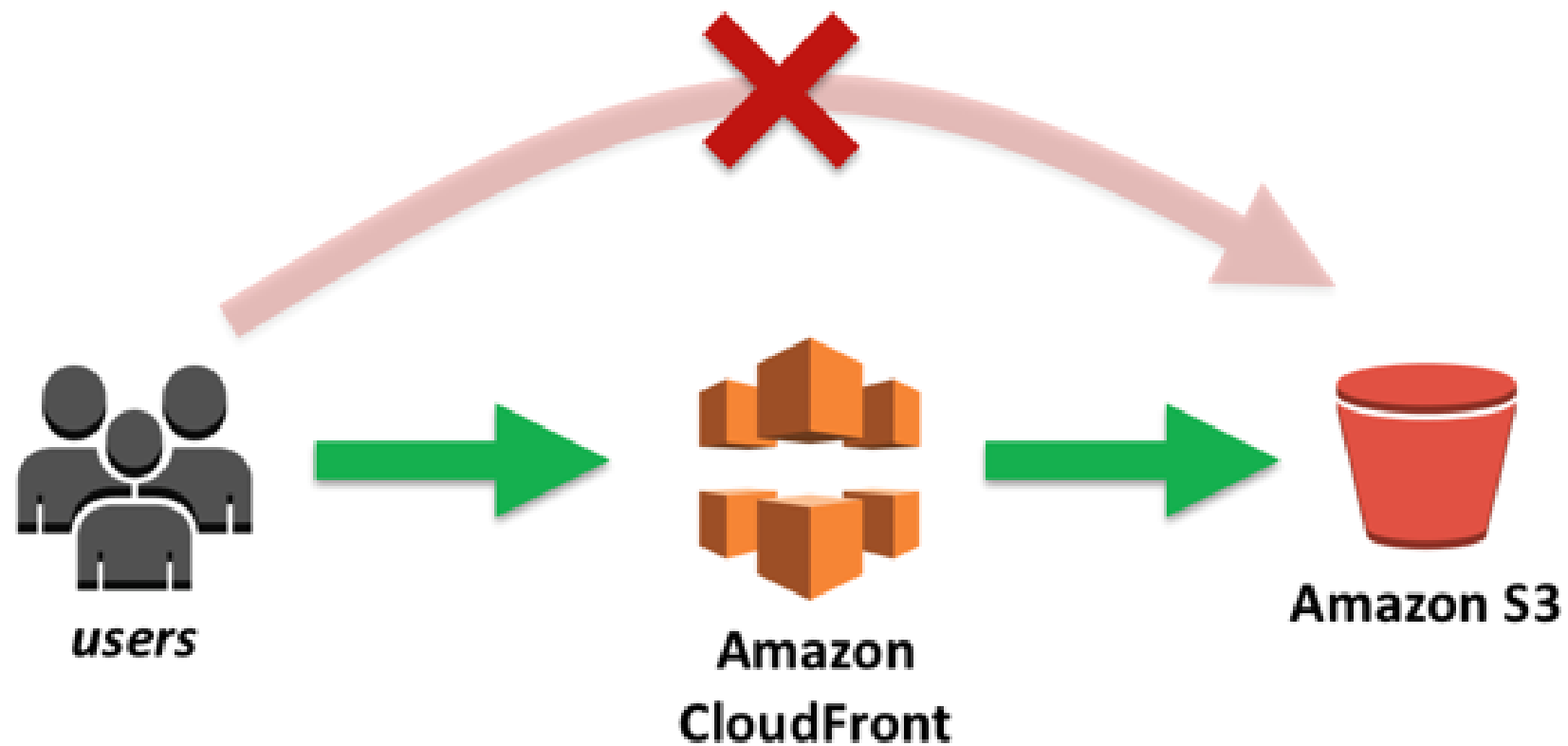
First request



Second request



# Amazon CloudFront



# Database



**Amazon  
DynamoDB**



**Amazon  
RDS**

Deployment & Administrator

App Services

Compute

Storage

Database

Networking

AWS Global Infrastructure

## Relation Database service

Database-as-a-service

No need to install or manage database instances  
scalable and fault tolerant configurations

## DynamoDB

Provisioned throughput NoSQL database

Fast, predictable performance

Fully distributed, fault tolerant architecture

## Self-managed

Your choice of database running on EC2



# Application Service



Amazon  
SQS



Amazon  
SNS

Deployment & Administrator

App Services

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AWS Global Infrastructure

## Amazon SQS

Reliable, highly scalable, queue service for storing messages

## Amazon SNS

Amazon Simple Notification Service (**Amazon SNS**) is a web service that enables applications, end-users, and devices to instantly send and receive notifications

## Amazon SES

Amazon Simple Notification Service (**Amazon SNS**) is a web service that enables applications, end-users, and devices to instantly send and receive notifications

# Deployment & Administrator



Elastic Beanstalk



Cloud  
Formation



IAM

Deployment & Administrator

App Services

Compute

Storage

Database

Networking

AWS Global Infrastructure

## Elastic Beanstalk

You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring.

## Cloud Formation

AWS CloudFormation gives developers and systems administrators an easy way to create and manage a collection of related AWS resources, provisioning and updating them in an orderly and predictable fashion.

## Identity & Access Management

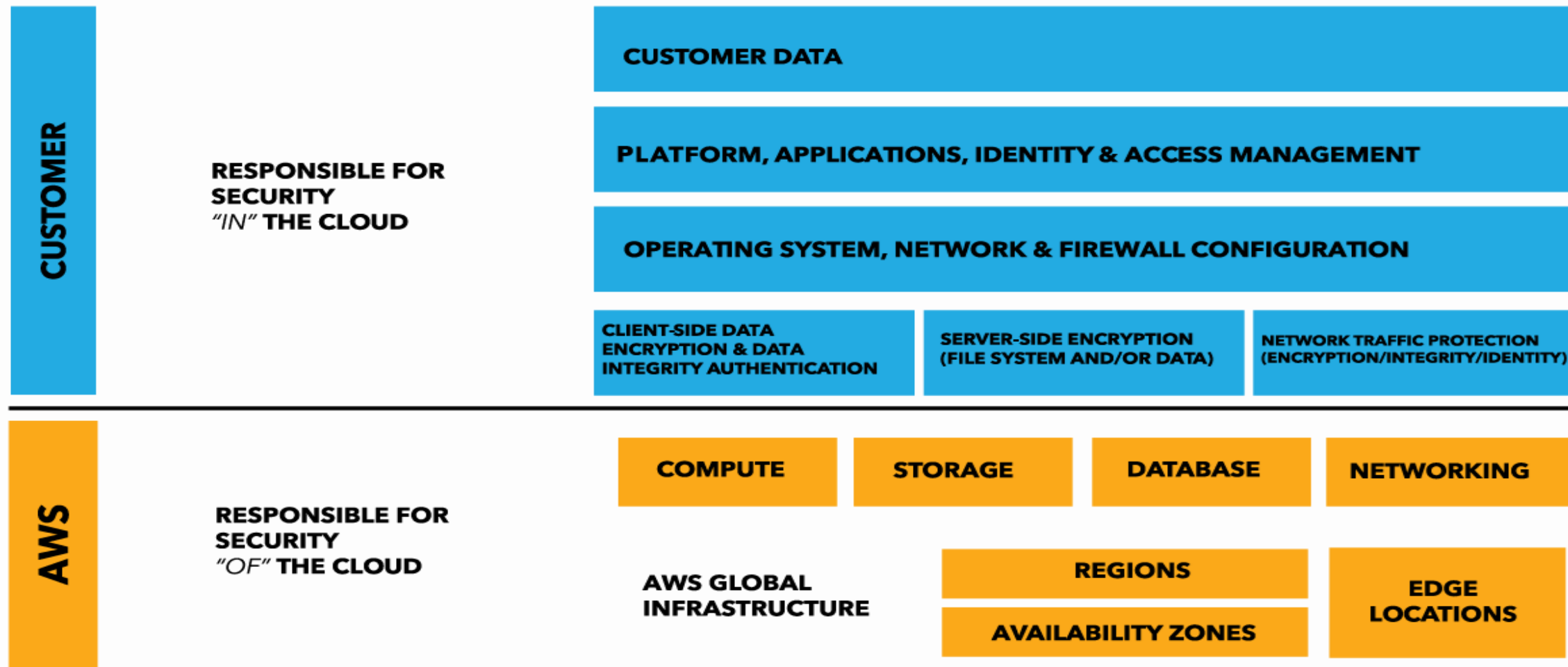
Centrally manage access and authentication of your users to your AWS resources.

# Type of Security Credentials

<b>Email address and password</b>	Associate with your AWS Account (Root)
<b>IAM User name and password</b>	Use for access the AWS management console
<b>Access key</b>	Typically use with CLI and programmatic requests like API and SDKs
<b>Multi-Factor Authentication</b>	Extra layer of security
	can be enable for root account and IAM user
<b>Keypair</b>	Used only for specific AWS services like Amazon EC2

# **AWS Shared Responsibility Model**

# AWS Shared Responsibility Model



# **AWS Training & Certification**

## Self-paced lab



## Training



## Certification



Try product, gain new skill, and  
get hand-on practice working  
AWS technologies

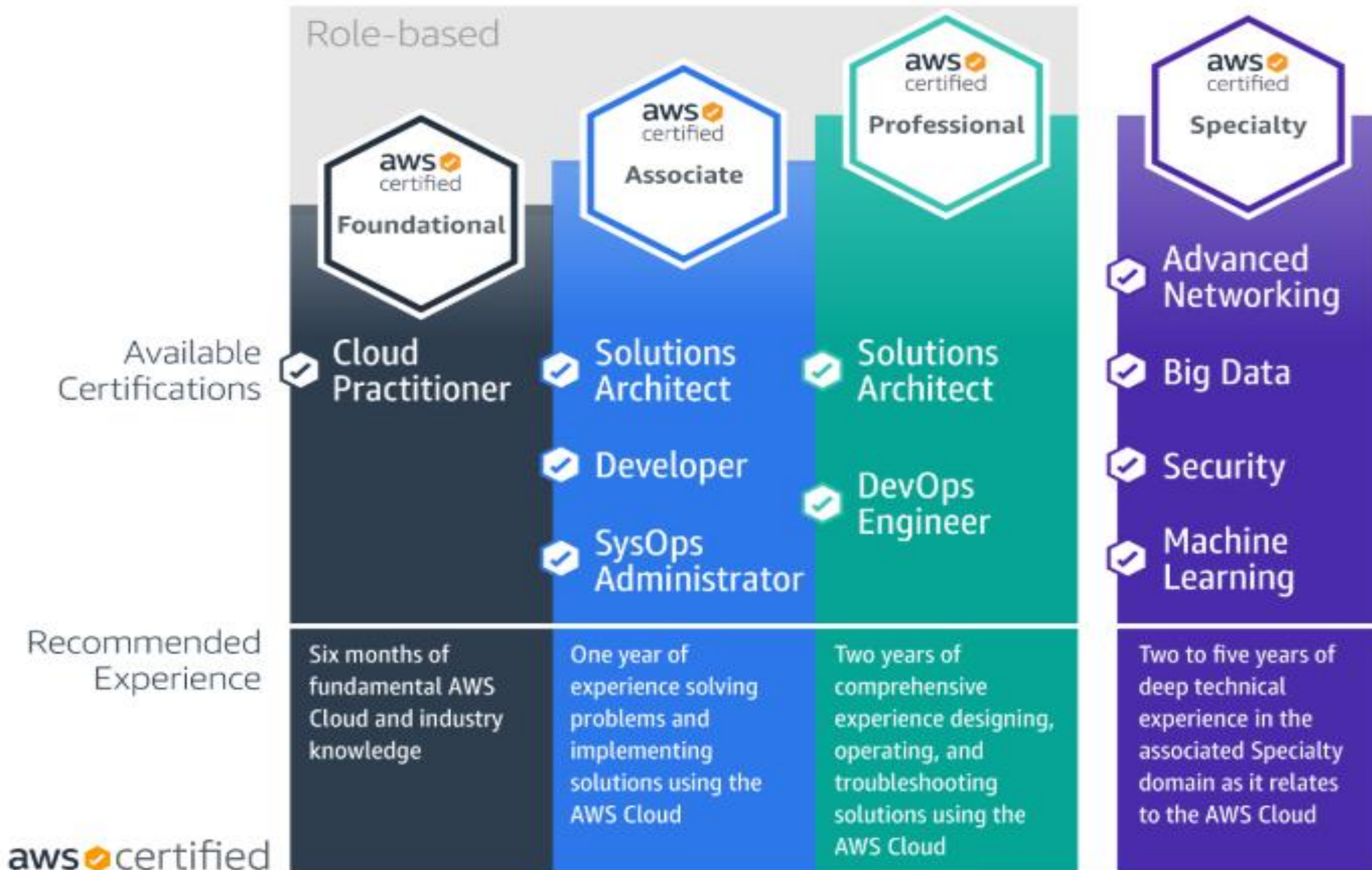
<https://aws.amazon.com/training/self-paced-labs/>

Build Technical experties  
to design and operate  
scalable, efficient  
applications on AWS

Validate your proven skills  
and experties with the AWS  
platform

<https://aws.amazon.com/certification/>

[Amazon Web Services – Overview of Amazon Web Services](#)





# Getting Started With AWS

# What are the first things to do with a new AWS Account?

- 1/ Stop using your **root account** as soon as possible
- 2/ Require **multi-factor** authentication for access
- 3/ Enable **AWS Cloudtrail**
- 4/ Track change to resources with **AWS Config**
- 5/ Enable a **billing report**, such as the AWS cost and usage Report

# Questions Thank You !

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