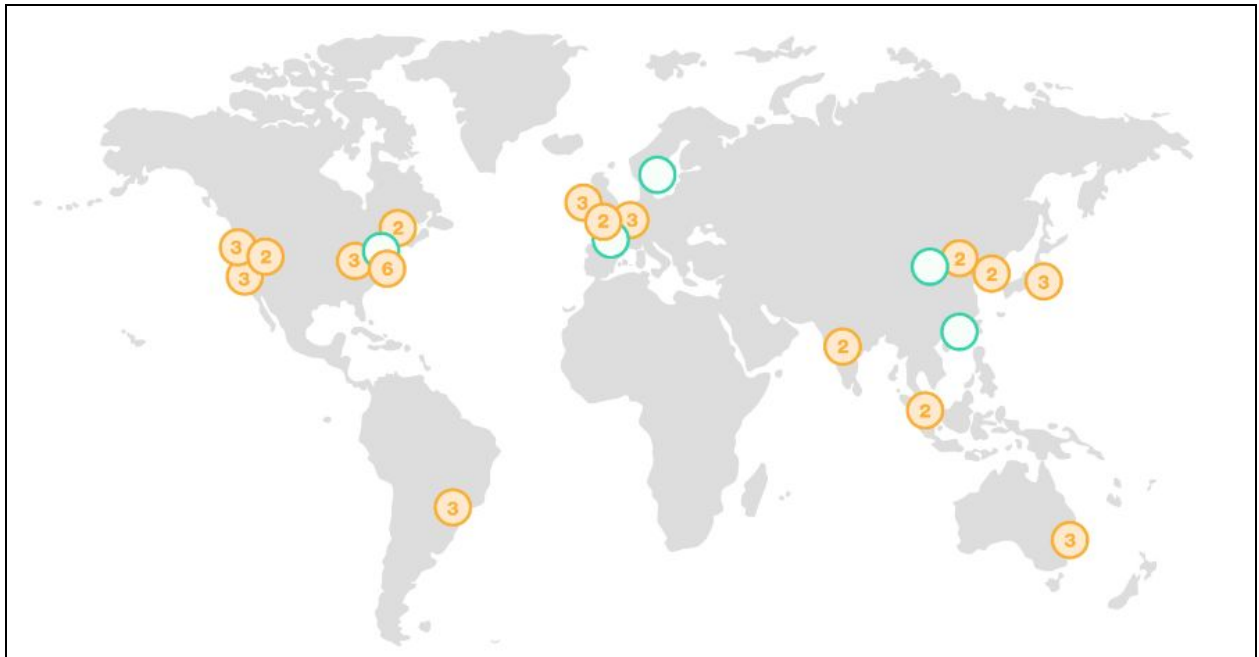**What is AWS?**

Amazon Web Services or AWS is a comprehensive public cloud computing platform that offers a variety of web-based products and services on an **on-demand** and **pay-per-use** basis. AWS was earlier a part of the e-commerce giant Amazon.com, and it wasn't until 2006 that AWS became a separate entity (business) of its own.

Note: Everything in AWS seems to be virtual but there really are Physical items

Today, AWS operates globally with data centers located in USA, Europe, Canada, Asia Pacific, China, and South America. AWS provides a variety of mechanisms, using which the end users can connect to and leverage its services, the most common form of interaction being the web-based dashboard also called as AWS Management Console.

So AWS has 16 geographic Regions which operates 44 Availability Zones. In future, they have a plan for 5 more Regions with 14 AZ.

For latest info: https://aws.amazon.com/about-aws/global-infrastructure/

Why AWS?

- As of today, largest public cloud/ Cloud computing platform on this planet.

- It all started in 2006, and within 12 years of time, they are the market leaders with Full experience.

- Other players are Microsoft Azure, Google Cloud, Rackspace, VMware Vcloud, CSC Cloud and many more.

History of AWS

- AWS history starts in 2003, Chris Pinkman and Benjamin Black submitted paper about Amazon's Infrastructure
- In 2004, they launched SQS
- In 2006, they started S3 and then EC2 (famous AWS service)
- Next year 2007, they had 150000+ developers on the platform
- Today, it's the largest cloud service provider, innovative company.

How to use?

- **AWS Management Console login (graphical)**
- **AWS CLI**
- **AWS API**

Pre-requisites:

- No specific pre-req but better to have knowledge about IT related terms
- Reading English and Apply general senses **. -**

Post-Requisites:

-Repeat,Repeat,Repeat

- Take Key notes

- Build a Lab

- Fall in Love with aws (Don't Fear because you hate it so start loving it so that No fear)

About AWS Certifications

There are 3 types of Certification

1) Associate Level- Developer, SysOps Admin, Solution Architect
2) Professional Level – DevOps, Solution Architect
3) Specialty Beta Level – Security, Advanced Networking, Big Data

Please check: https://aws.amazon.com/certification/our-certifications/

AWS Certified Solution Architect

Exam Pattern

-> Multiple Choice questions - 60

-> 80 minutes duration

->Scenario based questions

-> Practice exam Fee - $20

-> Main Exam Fee - $150

Exam Blueprint

-> Designing High Availability, cost efficient, fault tolerant, scalable systems - 60%

-> Implementation and Deployment - 10%

-> Data Security -20%

-> Troubleshooting -10%

-> Total - 100%

-> Pass Marks - 65% may be

More information about Solution Architect Associate exam is in below link
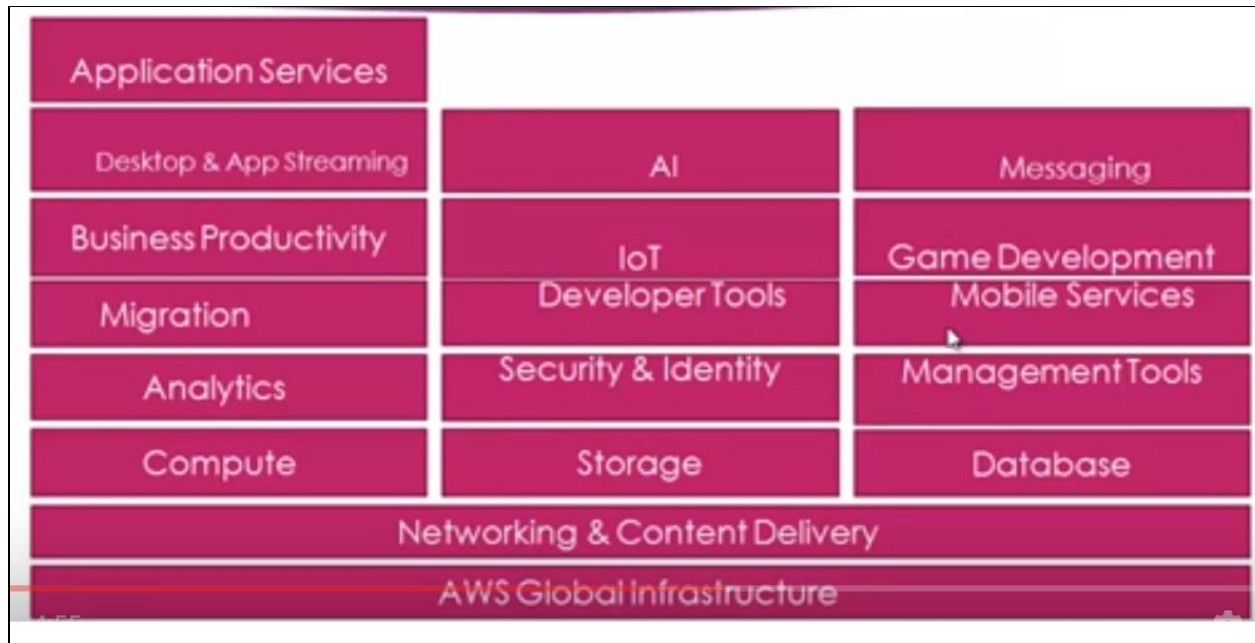
https://aws.amazon.com/certification/cetified-solutions-architect-associate

Preparation

->Read White papers

->Do practice on AWS free tier

->Write Mock exams before final exam

AWS Platform / AWS Services offering

For EXAM:

Architecture and Components of AWS

AWS Global Infrastructure

- **It not a service offering but it is actual infrastructure that AWS using for its services to run.**
- **3 important terms**
    - ➔ **Region**
    - ➔ **Availability Zones (AZ)**
    - ➔ **Edge Location**

Please check here for latest info

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

REGIONS: Physical location in the world where AWS resource exists, they have multiple Availability zones. It's a combination of 2 or more AZ

AVAILABILITY ZONES: Consists of one or more discrete Data Centers / AWS facility area, each with redundant power, networking and connectivity, housed in separate facilities

The AWS Cloud operates 44 Availability Zones within 16 geographic Regions around the world, with 14 more availability Zones and 5 more Regions coming online throughout the next year. AWS keeps on adding them.

Edge Location: CDN (Content Delivery Network) endpoint for Cloudfront.

It's a place where data is cached.50+ edge locations and growing!
(It's an end point of CDN, CDN service of Amazon is known as Cloud Front)

AWS Compute

➔ **EC2** – Elastic Compute Cloud. It is just a virtual server in Cloud, which is called as Instance. EC2 is a web service that provides flexible, resizable, and secure compute capacity on an on-demand basis.
 AWS started off with EC2 as one of its core services way back in 2006 and has not stopped bringing changes and expanding the platform ever since.
This compute infrastructure runs on a virtualized platform that predominantly consists of the open source Xen virtualization engine.

➔ **EC2 Container Service (ECS):** This service allows you to easily run and manage docker containers across a cluster of specially created EC2 instances. [Container Virtualization]

➔ **Elastic Beanstalk** : It's the way you run and manage web applications. For developers, just upload the code and amazon does the validation and provisions resources for that requirement

➔ **Lambda** : (It's a huge and trendsetting offering from AWS) It helps the companies to run the code without thinking / worrying about the servers. One of the powerful and expanding area of AWS. (It is also known as server-less architecture, you only think about the code and whenever the code is running , you will be charged for only the code execution time)

➔ **Lightsail** : It's a new service launched as a part of reinvent 2016. This service will allow you to launch and manage your own virtual private networks.

AWS Storage

This includes the following services:

➔ Simple Storage Service (S3): S3 is a highly scalable, highly reliable, fault tolerant and fully redundant data storage infrastructure provided by AWS. It was one of the **first services** offered by AWS way back in 2006, and it has not stopped growing since. As of April 2013, an approximate 2 trillion objects have been uploaded to S3, and these numbers are growing exponentially each year.
It is the **object-based storage** that means you can store flat files, or video files or audio files etc but can't install any software etc.
E.g.: Dropbox – that's the service facility running on s3 model.

➔ Elastic Block Storage (EBS): EBS is a raw block device that can be attached to your compute EC2 instances to provide them with persistent storage capabilities.

➔ Elastic File System (EFS): Fully managed file system for EC2 instances.
It is the Block-level storage. Think of it as NAS in the cloud for many EC2 (shared), you can connect one single Elastic File System to multiple EC2 instances. You can share one single EFS to multiple EC2 instances.
Basically, this is the storage used for EC2 instance

➔ Amazon Glacier: It is a similar service offering to S3. Amazon Glacier offers long-term data storage, archival, and backup services to its customers. It's simply a File archival place, data access takes 2-4 hours retrieval time but cost is very low.
It is used as for backup. Secure and low cost storage option for data archive and longtime backup.

➔ Storage Gateway: **Hybrid Storage Integration**
Maybe you have your own D.C and the network and you need to back your data up or suppose you need to send your data to amazon storage. In this case, storage gateway will be of great help.
The AWS Storage Gateway is a service connecting an on-premises software appliance with cloud-based storage to provide seamless and secure integration between an organization's on-premises IT environment and AWS's storage infrastructure.

AWS Networking and Content Delivery

Amazon VPC –

VPC enables you to create secure, fully customizable, and isolated private clouds within AWS's Premises. They provide additional security and control than your standard EC2 along with connectivity options to on premise data centers.

It stands for Virtual Private Cloud. Amazon give this offering where you can provision logically isolated section of AWS cloud where you can launch your own AWS resources in a virtually defined network. This virtual network you need to define that. You have the complete control over this. You can customize your network by providing your own IP address range , subnet and so on.

The idea here is to give you complete access over your own virtually defined network and host a small portion of AWS inside that. Think as Isolated Data Center.

In short, VPC is isolated cloud resources within AWS.

Direct Connect –

Dedicated Network Connection to AWS. Way of connecting to AWS without the need of internet. Helps the data transport from or to the AWS Infra via secure Line

Explanation: It is the way to connect directly to the AWS without using internet. It is the dedicated network connection to AWS. We are connecting to AWS without the need of internet, helps the data transport from AWS end to AWS infrastructure via secure line.

The benefits is

1. **Increase bandwidth (1Gbps or 10gbps lines)**
2. **Low- latency**

Since they have this dedicated channel where they offers 1Gbps or 10Gbps port

Route 53 –

Route 53 is a highly scalable and available DNS web service provided by AWS. Rather than configuring DNS names and settings for your domain provider, you can leverage Route 53 to do the heavy lifting work for you.

Cloudfront –

This is Global Content Delivery Network offering from AWS and it has Edge location which caches the data.

Amazon CloudFront is basically a content delivery web service that can be used to distribute various types of content, such as media, files, and so on, with high data transfer speeds to end users globally. You can use CloudFront in conjunction with other AWS services such as EC2 and ELB as well.

Example: suppose your data is stored somewhere in U.S.A location, and if someone from india wants to use your data, think how the network traffic will be,

The request from indian user has to travel all the way across to U.S.A, this is the very long way it has to travel, it may be network delay or network latency would come so the best way to avoid this problem is to CACHE THIS DATA somewhere in Mumbai so that you don't need to reach to usa. The bandwidth will be very nice and no network latency will be there.

Elastic Load Balancer (ELB): ELB is a dynamic load balancing service provided by AWS used to distribute traffic among EC2 instances.

AWS Databases Service

This includes the following services:

#1: Amazon Relational Database Service (RDS): RDS provides a scalable, high-performance relational database system such as MySQL, SQL Server, PostgreSQL, and Oracle in the cloud. RDS is a completely managed solution provided by AWS where all the database heavy lifting work is taken care of by AWS
Aurora is AWS database software (RDS based)

#2: Amazon DynamoDB: DynamoDB is a highly scalable NoSQL database as a service offering provided by AWS.

#3 Elasticache : In-memory cache to help the DB. Cache the data in cloud to improve DB performance and to reduce DB load.
Popular queries are stored in cache , it's good for DB performance.

#4: Amazon Redshift: Amazon Redshift is a data warehouse service that is designed to handle and scale to petabytes of data. It is primarily used by organizations to perform real-time analytics and data mining. Redshift is fast, simple, cost effective data warehousing solution from AWS.

AWS Security and Identity

-> IAM (Identity Access Management) - Management of users, groups, Roles, Policies, password policies, encryption keys etc… (one of the important topic for exam)

-> Inspector - Analyze application security. Inspect the EC2 instance by installing agents.

(Using this service, we can take care of application security. It will install a particular agent on this EC2 instance and then this service will scan for security related items and in turn it feeds you with application security related threats and you can take action as per your standard)

-> WAF & Shield - Web Application Firewall service. It helps to filters the malicious web traffic to your applications and to your instances.

-> Certificate - Manage the ssl/tls certificates

-> Compliance Report - AWS compliance reports on-demand

(Compliance report is an artifacts repository wherein you have all the information compliance related reports)

-> Directory Services - Host and Manage Active Directory Integration within AWS

AWS Management Tools

-> **Cloud Watch** - Monitoring AWS resources and applications.

(It will help you to monitor your resources and application which is hosted inside AWS. It let you to create the custom dashboard which will have details like CPU utilization, memory utili, disk utili , network utili , instance availi and instance status.

-> **Cloud Formation -** Create and Manage resources with templates.

(It is one of the innovative way where in we work with templates. By using templates, we can create and manage resources within AWS. Suppose if you want to create an entire Infrastructure, you can do it within seconds or minutes by using templates) It converts the complete infrastructure to code and you can modify the code and internally it changes the resources etc..)

-> **Cloud Trail** - Track user activity and API usage.

(This service from AWS will let you to track user activity and API usage. it will log what user did and how API was used and everything is captured here)

-> **Config** - Track resource inventory and changes.

This will help you to track resource inventory and changes. so can treat your infrastructure based on inventory,if you need to change any config then you can do it using this service.

-> **OpsWorks** - Automate operations using chef

AWS Opsworks helps you to automate operational work in your infrastructure by using the capabilities of chef.

-> **Service Catalogue** - Create and use standardized products.

-> **Trusted Advisor** - Optimize performance and security (Free-tier and Enterprise-tiers)

It gives the advices related to security by scanning

AWS Messaging

This includes the following services:

#1: Amazon Simple Notification Service (SNS): SNS is a simple, fully managed push messaging service provided by AWS. You can use it to push your messages to mobile devices (SMS service) and even to other AWS services as API calls to trigger or notify certain activities.

#2: Amazon Simple Email Service (SES): As the name suggests,SES is used to send bulk emails to various recipients. These e-mails can be anything, from simple notifications to transactions messages, and so on. Think of it as a really large mail server that can scale as per your requirements and is completely managed by AWS.

#3 Amazon Simple Queue Service (SQS) - It is Message Queue Service

AWS Migration Services

-> DMS - Database Migration Service. Easier and managed DB migration projects.
(you can migrate from on-premise db to AWS DBs)

-> **Server Migration** - Migrate on-premise servers to AWS

-> **Snowball** - Large Scale Data Transfers. Use snowball appliance to move data to and from AWS cloud.
(It is used for PetaBytes of data transfer. You can buy this appliance which has Petabytes of storage to transfer data.

AWS Developer Tools

-> **CodeCommit** - Store code in private git repo

(It provides private git repository where you can store your code. Its kind of source control service)

-> **Code Build** - Build and test code (code compilations) - Its new service

It helps you to build the code base , you can test the code and it does the code compilation as well.

-> **CodeDeploy** - Automate the code deployments

(It will help you to automate the deployment, whatever package you build , you can feed it to code deploy and then it will take the packages and deploy at the final instance or site

-> **Code Pipeline** - Release software using Continuous Delivery (CD)

(It use for releasing softwares using Continuous Delivery or CD mechanism)

AWS Application Services

-> **Step Function** - Coordinate distributed applications. It's a new addition from AWS

(you can create some custom functions for some sort of custom actions while coordinating with applications)

-> **API Gateway** - Build, deploy and manage API's

(Fully managed service which can manipulate or create service API in a scale)

-> **Appstream** - Low latency application streaming

(Best example is XenApp, you can stream windows application from cloud without any hurdle. no need to do any custom code changes. It is essential way of stream the applications)

-> **Elastic Transcoder** - Easy to use scalable media transcoding. Media file format conversations to be compatible for different devices.

-> **SWF** - It stands for Simple Workflow Service. It used for coordinating application components.

It helps to run the background jobs and build things.

AWS Analytics Service

-> **Athena** - Query data in S3 using SQL. It's a new offering from AWS.
(It is the way to query the data in S3 using SQL, utilize S3 storage space where you can run the SQL queries)

-> **EMR (Elastic Mapreduce)** - It is for managing Hadoop Framework. To handle big data.

-> **Data Pipeline** - Orchestration of data-driven workflow. It helps us to move the big chunk of data from one place to another.

-> **Cloudsearch** - Managed search service.
(It is the way of enabling your website / application with search capabilities (like auto completion, suggestions, etc….)

-> Elasticsearch service
-> Kinesis
-> Machine Learning
-> Quick Sight (BI Tool)

AWS Mobile Services

-> **Mobile Hub** - Build, test, run and monitor mobile applications

-> **Cognito** - User identity and app data synchronization

-> **Device Farm** - Test android, iOS and web apps on real devices in the cloud (Nice one, you can create application and test it in real devices of android and ios)

-> **Mobile Analytics** - Collect, view and export app analytics

-> **Pinpoint** - Push notifications for mobile devices

AWS Game Development

-> **Game Lift** - It deploy and scale session-based multiplayer games.

AWS IoT Services

-> **IoT - Internet of Things**. Very innovative topic in the future. It helps you TO CONNECT all devices to the cloud.

-> A proposed development of internet in which everyday objects have network connectivity, allowing them to send and receive data.

-> It is expanding area for new generations

Business Productivity

-> **WorkDocs** -It provides secure enterprise storage and sharing services within AWS.

-> **WorkMail** - Secure email and calendaring services.

Desktop and App Streaming

-> **Workspace** - It helps you to launch your own desktop in cloud

-> **AppStream 2.0** - It helps you to stream app securely to any browser.

Artificial Intelligence

It is something which is replacing human beings for doing repetitive work using intelligence

-> **Lex** : Build voice and text chat bots

-> **Poly** : Turn text into life like speech

-> **Rekognition** : Search and Analyze images

-> **Machine Learning** : Build smart applications quickly and easily (smart means new generation like interactive capabilities)