# Week 1

## The Foundation Of AWS Services

Amazon Web Services (AWS) is a behemoth in cloud computing industry, offering a wide array of services and tools to meet the needs of individuals, startups, enterprises, and even governments. At the core of AWS are a set of fundamental services that serve as the building blocks for almost any cloud application or infrastructure. In this comprehensive guide, we will explore the key AWS Core Services, their significance, and how they form the foundation of cloud computing in the 21st century.

## Introduction to AWS Core Services

AWS Core Services are a set of foundational cloud computing services that provide essential building blocks for a wide range of applications and use cases. These services are designed to be highly scalable, reliable, and cost-effective, making them the go-to choice for businesses of all sizes looking to leverage the power of the cloud.

##Key AWS Core Services

### Compute

- Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers. Amazon EC2 offers a broad selection of instance types optimized for different workloads, such as general purpose, compute-intensive, memory-intensive, and accelerated computing.

- Amazon Elastic Container Service (Amazon ECS) is a container orchestration service that helps you easily deploy, manage, and scale containerized applications. Amazon ECS supports Docker containers and provides features such as load balancing, service discovery, and logging.

- Amazon Elastic Kubernetes Service (Amazon EKS) is a managed Kubernetes service that makes it easy to deploy, manage, and scale containerized applications on Kubernetes. Amazon EKS runs on AWS infrastructure and provides features such as high availability, security, and scalability.

### Storage

- Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. Amazon S3 is designed for a wide range of use cases, including data lakes, websites, mobile applications, backup and restore, archiving, and disaster recovery.

- Amazon EBS (Elastic Block Store): Amazon EBS is a block storage service designed for use with Amazon EC2 instances. It provides high-performance, low-latency storage volumes that can be attached to EC2 instances. EBS is essential for applications requiring persistent storage.

- Amazon Elastic File System (Amazon EFS) is a shared file system service that provides scalable, durable, and elastic file storage for Amazon EC2 instances. Amazon EFS enables multiple Amazon EC2 instances to access a common file system with high performance and low latency.

### Networking

- Amazon Virtual Private Cloud (Amazon VPC) is a networking service that lets you create a private network in the AWS cloud. Amazon VPC gives you complete control over your virtual networking environment, including the IP address range, subnets, network gateways, and route tables.

- Amazon Route 53 is a domain name system (DNS) service that provides high availability and low latency for your websites and applications. Amazon Route 53 can route traffic to your applications hosted on AWS or on-premises.

- Amazon Elastic Load Balancing (Amazon ELB) is a load balancing service that distributes traffic across multiple Amazon EC2 instances. Amazon ELB can help you improve the performance and reliability of your applications.

### Databases

- Amazon Relational Database Service (Amazon RDS) is a managed relational database service that supports a variety of database engines, including MySQL, PostgreSQL, Oracle, SQL Server, and MariaDB. Amazon RDS makes it easy to set up, operate, and scale a relational database in the cloud.

- Amazon Aurora is a relational database service that combines the performance and availability of high-end commercial databases with the simplicity and cost-effectiveness of open source databases. Amazon Aurora is compatible with MySQL and PostgreSQL.

- Amazon DynamoDB is a NoSQL database service that provides single-digit millisecond performance at any scale. Amazon DynamoDB is ideal for mobile, web, gaming, ad tech, and Internet of Things (IoT) applications.

### Analytics

- Amazon Redshift is a petabyte-scale data warehouse service that makes it easy to analyze all your data using standard SQL. Amazon Redshift provides high performance and low cost for large-scale data analysis.

- Amazon Athena is a serverless interactive query service that makes it easy to analyze data in Amazon S3 using standard SQL. Amazon Athena is ideal for ad hoc queries and interactive data visualization.

- Amazon Elastic MapReduce (Amazon EMR) is a managed Hadoop framework service that makes it easy to run big data processing frameworks like Apache Hadoop and Apache Spark. Amazon EMR is ideal for large-scale data processing and machine learning workloads.

### Machine Learning

- Amazon SageMaker is a managed machine learning service that makes it easy to build, train, and deploy machine learning models. Amazon SageMaker provides a variety of pre-built machine learning algorithms and tools to help you get started with machine learning.

- Amazon Rekognition is an image and video analysis service that uses deep learning to recognize objects, faces, scenes, and activities in images and videos. Amazon Rekognition can be used to build applications such as image search, facial recognition, and content moderation.

- Amazon Polly is a text-to-speech service that uses deep learning to synthesize speech from text. Amazon Polly can be used to build applications such as A talking book app for children,A customer service chatbot for a retail company and A marketing campaign for a new product launch.

### Other Core services

- Amazon CloudWatch: Amazon CloudWatch is a monitoring and observability service that collects and tracks data from various AWS resources. It provides insights into resource utilization, application performance, and operational health. CloudWatch is critical for maintaining the health and performance of cloud applications.

- AWS Lambda: AWS Lambda is a serverless compute service that allows users to run code in response to events without the need to manage servers. Developers can use Lambda to build scalable, event-driven applications and microservices. It is a key component for building serverless architectures.

- Amazon SQS (Simple Queue Service): Amazon SQS is a fully managed message queuing service that enables decoupling of application components. It provides a reliable and scalable way to transmit any volume of data between distributed systems. SQS is commonly used in applications with high message throughput and processing.

- Amazon SNS (Simple Notification Service): Amazon SNS is a messaging service that allows users to send messages or notifications to distributed systems and individuals. It can be integrated with other AWS services to automate communication in response to events.

## Significance of AWS Core Services

### The AWS Core Services play a pivotal role in cloud computing for several reasons

- Scalability: AWS Core Services are designed to scale with your needs. You can easily increase or decrease resources to match demand, ensuring that your applications remain responsive.

- Reliability: These services are built with redundancy and high availability in mind. AWS data centers are distributed globally, reducing the risk of outages and data loss.

- Cost-Efficiency: AWS Core Services offer a pay-as-you-go model, so you only pay for what you use. This is cost-effective for businesses, especially when compared to the expense of maintaining on-premises infrastructure.

- Security: AWS places a strong emphasis on security and provides tools to help you secure your applications and data. Services like Amazon VPC, security groups, and IAM (Identity and Access Management) enable you to establish robust security measures.

- Managed Services: Many of the core services, such as Amazon RDS and AWS Lambda, are fully managed by AWS. This means AWS handles routine maintenance tasks, allowing you to focus on developing your applications.

- Global Reach: AWS has a global network of data centers, providing low-latency access to users worldwide. This is crucial for businesses serving a global customer base.

### Use Cases and Examples

To illustrate the practical applications of AWS Core Services, let’s consider a few use cases:

#### Use Case 1: E-commerce Platform

Suppose you’re running an e-commerce platform. You can use Amazon EC2 instances to host your web application, Amazon S3 to store product images and documents, Amazon RDS to manage your product catalog and customer data, Amazon VPC to secure your network, and Amazon CloudWatch to monitor the performance of your servers. This combination allows you to build a scalable, reliable, and secure e-commerce solution.

#### Use Case 2: Mobile App Back End

If you’re developing a mobile app, AWS Lambda can power the back end of your application. When users interact with your app, Lambda functions can process data, perform calculations, and access other AWS services like Amazon DynamoDB (a NoSQL database). You can use Amazon SNS for push notifications and Amazon Cognito for user authentication.

#### Use Case 3: Data Analytics

For data analytics, you can leverage Amazon Redshift (a data warehousing service) to store and analyze large datasets. Amazon EMR (Elastic MapReduce) can be used to process big data workloads using tools like Apache Hadoop and Apache Spark. Amazon S3 is an ideal storage solution for big data workloads, while Amazon CloudWatch provides insights into the performance of your data processing jobs.

### Conclusion

AWS Core Services are the bedrock of Aws cloud computing, offering a wide range of capabilities to meet the diverse needs of businesses and developers. Whether you’re running a simple web application or building a complex data analytics platform, these services provide the scalability, reliability, and security required in the modern digital landscape.

As AWS continues to innovate and expand its service offerings, the Core Services remain at the heart of the cloud ecosystem, empowering organizations to harness the full potential of cloud computing. Whether you’re just getting started with AWS or looking to optimize your existing cloud infrastructure, understanding and effectively utilizing these core services is crucial for your success in the cloud.

Additional resources

- https://aws.amazon.com/developer/language/net/services/

- Follow me on medium https://medium.com/@daniel\_clement