

A Survey For The Features Of Various Tools And Services Available In Amazon Web Services (AWS)

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ABSTRACT

Amazon Web Services is the largest cloud computing platform with various featured resources. AWS offers a pay as you go feature. Need to pay as you use for the service and time period you use. Being it is cost effective, we can focus on enhancing the solution. AWS spread everywhere from small start ups to large enterprises with expandable services. We can use it for data storage and analysis. So, we did a survey for the features of various tools and services available in AWS with the help of AI tools to provide information at one place.

Keywords : Cloud Computing, Enterprises, Tools, Web Services

I Introduction

Cloud computing is the on demand delivery of compute power, database, storage, applications, and other IT resources via the internet with pay-as-you-go pricing. These resources run on server computers that are located in large data centers in different locations around the world. When you use a cloud service provider like AWS, that service provider owns the computers that you are using. These resources can be used together like building blocks to build solutions that help meet business goals and satisfy technology requirements [1].

1.2 Cloud Service Models:

There are three main cloud service models. Each model represents a different part of the cloud computing stack and gives you a different level of control over your IT resources:

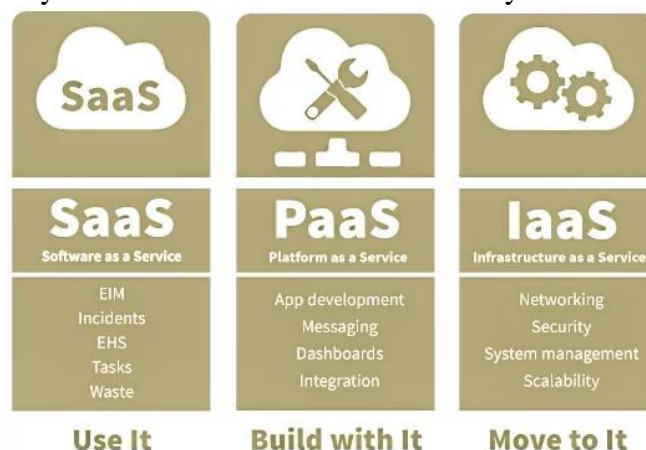


Figure 1

Figure 1, has been taken from the dev team site [2].

1.2.1 Infrastructure as a service (IaaS):

Services in this category are the basic building blocks for cloud IT and typically provide you with access to networking features, computers (virtual or on dedicated hardware), and data storage space. IaaS provides you with the highest level of flexibility and management control over your IT

resources. It is the most similar to existing IT resources that many IT departments and developers are familiar with today.

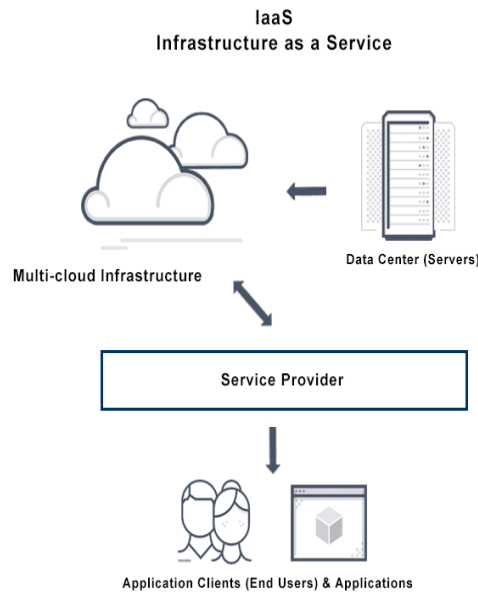


Figure 2

Figure 2, has been taken from the AVInetworks site [3].

1.2.2 Platform as a service (PaaS):

Services in this category reduce the need for you to manage the underlying infrastructure (usually hardware and operating systems) and enable you to focus on the deployment and management of your applications.

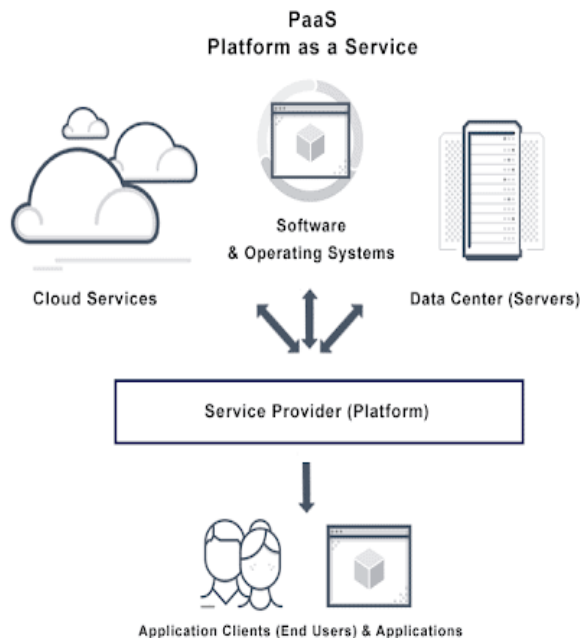


Figure 3

Figure 3, has been taken from the AVInetworks site [4].

1.2.3 Software as a service (SaaS):

Services in this category provide you with a completed product that the service provider runs and manages. In most cases, software as a service refers to end-user applications. With a SaaS offering, you do not have to think about how the service is maintained or how the underlying infrastructure is managed. You need to think only about how you plan to use that particular piece of software.

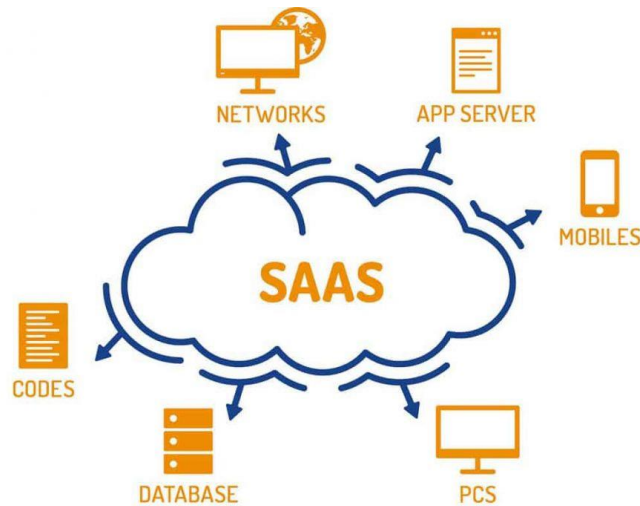


Figure 4

Figure 4, has been taken from the Speepage site [5].

1.3 Cloud Deployment Models:

There are three main cloud computing deployment models, which represent the cloud environments that your applications can be deployed in:

1.3.1 Cloud:

A cloud-based application is fully deployed in the cloud, and all parts of the application run in the cloud. Applications in the cloud have either been created in the cloud or have been migrated from an existing infrastructure to take advantage of the benefits of cloud computing. Cloud-based applications can be built on low-level infrastructure pieces or they can use higher-level services that provide abstraction from the management, architecting, and scaling requirements of core infrastructure.

1.3.2 Hybrid:

A hybrid deployment is a way to connect infrastructure and applications between cloud-based resources and existing resources that are not located in the cloud. The most common method of hybrid deployment is between the cloud and existing on-premises infrastructure. This model enables an organization to extend and grow their infrastructure into the cloud while connecting cloud resources to internal systems.

1.3.3 On-premises:

Deploying resources on-premises, using virtualization and resource management tools, is sometimes called private cloud. While on-premises deployment does not provide many of the benefits of cloud computing, it is sometimes sought for its ability to provide dedicated resources. In most cases, this deployment model is the same as legacy IT infrastructure, but it might also use application management and virtualization technologies to increase resource utilization.

1.4 Services Available in AWS :



Figure 5

Figure 5, has been taken from all code sites [13]. For this study top 25 websites were considered and they are as follows : Amazon EC2 (Elastic Cloud computing), Amazon RDS (Relational Database Services), Bonus Service: Amazon Connect , Amazon S3 (Simple Storage Service), Amazon Lambda, Amazon Cognito, Amazon Glacier, Amazon SNS (Simple Notification Service), Bonus Service: Amazon Lex, Amazon Lightsail, Amazon VPC (Virtual Private Cloud), Amazon Kinesis, Amazon Inspector, Amazon Auto-scaling, Amazon IAM (Identity and Access Management), DynamoDB, Amazon SQS (Simple Queue Service), Amazon ElastiCache, Amazon Chime, AWS Athena, CodeCatalyst, Web Application Firewall, AWS Amplify, AWS Rekognition, AWS QuickSight, AWS Cloudformation, AWS Management Console [13].

1.5 Tools Available in AWS : For this study 13 tools were considered and they are as follows : AWS Application Composer, AWS Cloud9, AWS CloudShell, AWS CodeArtifact, AWS CodeBuild, Amazon CodeCatalyst, AWS CodeCommit, AWS CodeDeploy, AWS CodePipeline, AWS CodeStar, Amazon Corretto, AWS Fault Injection Simulator, AWS X-Ray [14].

II Literature Survey

2010 : The term "cloud" was used by Google CEO Eric Schmidt to describe the online business service delivery model in 2006. Expressing different ideas the word cloud is used as a marketing term [6].

April 2013 : AWS is a cloud compiler provider. This service is a perfect example of true cloud computing that not only offers excellent cloud services but also offers privacy; integrity and availability of customer data [7].

June 2018 : AWS is a technology which resolves all cloud computing related issues. It gives highly secure infrastructure. Using AWS you need to worry about maintaining data centers, because here everything is managed by aws. Using aws you easily deploy your application in multiple regions around the world within minutes. Aws is a very cost effective, highly scalable, more secure best cloud service provider in the world [8].

January 2022 : In AWS, Confidentiality, Integrity, and Accessibility (CIA) [10,11] of user data is a very important task. The purpose of AWS is to maintain customer confidence and trust [12].

III Methodology

The survey for the features of various tools and services available in AWS was done using the following steps.

Step 1 : Use AI Tools like ChatGPT, Googlebard, MSbing

Step 2 : Get Features of various Tools and Services Available in AWS

Step 3 : Arrange them in Excel Sheets for Tools and Services Available in AWS separately.

Step 4 : Discuss the results for Tools and Services Available in AWS separately

IV Results and Discussions

4.1 Results

By using the methodology section, we can get the following results

S.No	Name of the Tool	Features
1	AWS Application Composer	Visual canvas, Infrastructure as code (IaC) generation, Team collaboration, Best practices, Local sync mode, Undo and redo, Template import and export, Integration with AWS services
2	AWS Cloud9	Cloud-Based IDE, Collaboration, Built-in Terminal, Code Editor, Serverless Development, Version Control, Customizable, Development Stacks, Debugging Tools, Secure and Scalable, AWS Integration, AWS Cloud Development
3	AWS CloudShell	Browser-based, Pre-authenticated, Fully managed, Up-to-date, Persistent storage, Secure, Multiple shell options, Integrated Documentation, Command completion, File Editing, File Transfer
4	AWS CodeArtifact	Secure storage, High availability and durability, Easy to use, Integrates with popular package managers, Scalable, Cost-effective, Package versioning, Package tagging, Upstream repositories, Package dependencies, Access control
5	AWS CodeBuild	Fully managed, Scalable, Secure, Fast, Customizable, Integration with AWS Services, Support for popular programming languages and build tools, Continuous integration and delivery (CI/CD) support
6	Amazon CodeCatalyst	Launch new projects quickly and easily, Create and manage cloud-based Dev Environments, Automate CI/CD pipelines, Collaborate with your team, Project blueprints, Cloud-based Dev Environments, Automated CI/CD pipelines, Team collaboration tools, Issue management, Monitoring and troubleshooting
7	AWS CodeCommit	Fully managed, Secure, Scalable, Highly available, Collaborative, Integrated with AWS DevOps services, Third-party integrations, API support
8	AWS CodeDeploy	Deployment automation, Blue-green and canary deployments, Rolling updates, Deployment health tracking, Deployment history, Integration with other AWS services, Deployment groups, Deployment triggers, Deployment notifications
9	AWS CodePipeline	Visualization, Automation, Approvals, Rollbacks, Integration with other AWS services, Parallel execution, Custom actions, Variables, Artifacts
10	AWS CodeStar	Project templates for various application types, Support for many popular programming languages, Pre-configured continuous delivery toolchain, Built-in security policies for various roles, Project dashboard for monitoring application activity, Integration with Atlassian JIRA, Built-in IAM support for managing developer identities, Secure storage of application code on AWS CodeCommit or GitHub
11	Amazon Corretto	No-cost long-term support from Amazon, Production-ready distribution of OpenJDK, Certified to meet the Java SE standard, Multipatform support for Linux, Windows, and macOS, Performance enhancements and security fixes critical for enterprise application development, User-friendly interface, performance, and speed
12	AWS Fault Injection Simulator	Fully Managed Service, Pre-built templates, Real-world failure conditions, Automated rollback
13	AWS X-Ray	End to end tracing, Support for Multiple languages, Real-world failure conditions, Service map, Request sampling

Table 1

S.No	Name of the Service	Features
1	Amazon EC2	Instance Types, Scalability, Amazon Machine Images (AMI), Elastic Block Store (EBS), Security Groups and Virtual Private Cloud (VPC), Auto Scaling, Load Balancing, Amazon EC2 Container Service (ECS), Spot Instances, Reserved Instances
2	Amazon RDS	Managed Service, Database Engine Support, High Availability, Backup and Restore, Scalability, Security, Monitoring and Metrics, Database Parameter Groups, Compatibility and Migration, Read Replicas, Database Engines
3	Amazon Connect	Scalability, Omnichannel Communication, Self-Service Options, Real-time and Historical Metrics, Routing and Queuing, IVR (Interactive Voice Response) System, Integration, Analytics and Machine Learning, Security, Global Reach, Pay-as-You-Go Pricing
4	Amazon S3	Object Storage, Scalability, Data Durability and Availability, Data Lifecycle Management, Data Versioning, Data Security, Data Access Control, Data Transfer Acceleration, Data Replication, Data Hosting, Data Analysis, Integration with Other AWS Services, Pay-as-You-Go Pricing
5	Amazon Lambda	Event-Driven Compute, No Server Management, Scalability, Support for Multiple Languages, Stateless Functions, Integration, Custom Triggers, Execution Environment, Pay-as-You-Go Pricing, Logging and Monitoring, Versioning and Aliases, Security and Permissions, Resource Cleanup
6	Amazon Cognito	User Sign-up and Sign-in, Multi-Factor Authentication (MFA), User Data Synchronization, Identity Pools, Scalability, Access Control, Customizable UI, User Profiles, Integration with AWS Services, Developer-Friendly SDKs, Security and Compliance
7	Amazon Glacier	Cost-Effective, Data Durability, Retrieval Times, Data Encryption, Lifecycle Policies, Vault Management, Compliance and Governance, Data Integrity Checks, Versioning, Monitoring and Notifications, Inventory Retrieval, Low-Latency Data Retrieval
8	Amazon SNS	Publish/Subscribe Model, Message Formats, Multiple Protocols, Message Filtering, Fanout Messaging, Push Notifications, SMS and Text Messaging, Email Notifications, Redundancy and High Availability, Message History, Message Delivery Status Tracking, Message Encryption, Access Control, Integration with AWS Services, Global Availability
9	Amazon Lex	Automatic Speech Recognition (ASR), Natural Language Understanding (NLU), Intent Recognition, Entity Recognition, Dialog Management, Multi-Platform Support, Integration with Messaging Services, Voice and Text Input, Fulfillment and Integration, Slot Types, Error Handling, Content Management, Versioning and Publishing, Monitoring and Analytics, Security, Scalability, Multi-Language Support
10	Amazon Lightsail	User-Friendly Interface, Preconfigured Blueprints, Scalability, Instance Options, Integrated Storage, Automated Backups, Data Transfer and Content Delivery, Security, Access and Monitoring, Developer-Friendly Tools, Global Availability, Static IP Addresses, API and CLI Access, Domain Management, One-Click Deployments
11	Amazon VPC	Isolated Network, Customizable IP Address Ranges, Subnet Creation, Security Groups and Network ACLs, Peering, VPN Connections, Direct Connect, Elastic Network Interfaces, Route Tables, Internet Gateway, Elastic Load Balancing Integration, Managed NAT Gateways, VPC Endpoints, Flow Logs, VPC Peering, Global Accelerator Integration, PrivateLink, Cross-Region VPC Peering
12	Amazon Kinesis	Data Streaming, Stream Management, Kinesis Data Streams, Kinesis Data Firehose, Kinesis Data Analytics, Kinesis Data Video Streams, Kinesis Data Streams Connectors, Scalability, Low Latency, Data Retention, Data Durability, Security, Data Transformation, Real-time Analytics, Integration with Other AWS Services, Monitoring and Logging
13	Amazon Inspector	Automated Security Assessments, Agent-Based Assessment, Assessment Templates, Built-In Rules Packages, Custom Rules, Scheduled Assessments, Findings and Reports, Integration with Other AWS Services, Compliance Reporting, Resource Group Assessment, Scalability, AWS Identity and Access Management (IAM) Integration, Simple Pricing Model, Data Protection, Support for Multiple Regions
14	Amazon Auto Scaling	Automatic Scaling, Target Tracking Scaling Policies, Step Scaling Policies, Scheduled Scaling, Dynamic Scaling, Health Checks, Mixed Instance Types, Integration with Load Balancers, Integration with AWS CloudWatch, Warm-Up andCooldown Periods, Custom Metrics, Predictive Scaling, Scale-In Protection, Event-Driven Scaling, Application Integration, Simple Management
15	Amazon IAM	Fine-grained access control, Delegate access by using IAM roles, IAM Roles Anywhere, IAM Access Analyzer, Permissions guardrails, Attribute-based access control
16	Amazon SQS	Fully Managed Service, Message Durability, Message Ordering, High Throughput, Delay Queues, Visibility Timeout, Long Polling, Access Control, Monitoring and Logging, Dead-Letter Queues, Cross-Region Replication, Message Size, Message Retention, Server-Side Encryption, Integration with AWS Services
17	Amazon ElastiCache	Easy to use, Fully managed Redis and Memcached, Performance and scalability, Availability and reliability, Cost optimization features
18	Amazon Chime	Online Meetings, Video Conferencing, Team Collaboration, Business Calling, Security and Administration
19	Amazon Athena	Serverless, Easy to use, Flexible pricing, Fast performance, Federated data source connectors
20	Web Application Firewall	Firewall Protection, HTTP Request Inspection, Security Policy Enforcement, Protection Against Common Attacks, Rate Limiting, Logging and Monitoring, SSL/TLS Offloading, API Security, Scalability, Custom Rules, Real-time Threat Intelligence, Content Delivery Network (CDN) Integration, Automatic Updates
21	AWS Amplify	Authentication, DataStore, Analytics, API, Functions, Geo, Interactions, Predictions, Pub/Sub, Push notifications, Storage
22	AWS Rekognition	Object detection, Scene detection, Activity detection, Face detection and analysis, Text detection and analysis, Celebrity recognition, Inappropriate content detection
23	AWS QuickSight	Data Source Connectivity, Data Preparation, Data Visualization, Interactive Dashboards, AutoGraph, Machine Learning Insights, Sharing and Collaboration, Embedding, Integration with AWS Services, Security and Access Control, Mobile Accessibility, Pay-as-You-Go Pricing
24	AWS CloudFormation	Declarative infrastructure as code, Dependency management, Stack updates, Change sets, Stacks across accounts and regions, Integration with other AWS services, Template composition, IAM Integration, Application Bootstrapping
25	AWS Management Console	Centralized access to all AWS services, Easy-to-use interface, Visualizations and dashboards, Search and filtering, Customization, Help and support, Security, Scalability, Availability

Table 2

Results in, Table 1, 2 represents the features of various Tools and services available in AWS respectively

4.2 Discussions

4.2.1 About Tools

AWS offers a wide range of tools for a variety of purposes, including:

Developer tools

- AWS Amplify: A framework for developing mobile and web apps.
- AWS Cloud9: A cloud-based IDE for writing, running, and debugging code.
- AWS CodeArtifact: A managed artifact repository service for storing and delivering software packages.
- AWS CodeBuild: A fully managed CI/CD service for building, testing, and deploying code.
- AWS CodeCommit: A fully managed Git code repository service for hosting and managing code in the cloud.

- AWS CodeDeploy: A fully managed deployment service for deploying code to AWS compute services.
- AWS CodePipeline: A fully managed continuous delivery service for automating the release and deployment process for applications.
- AWS Copilot: A managed service for building, deploying, and managing containerized applications.

Management tools

- AWS CloudTrail: A cloud audit service for tracking user activity and API calls.
- AWS CloudWatch: A monitoring service for collecting and analyzing performance, availability, and operational data.
- AWS Config: A service for recording and managing configuration changes to AWS resources.
- AWS Systems Manager: A service for managing AWS resources, software applications, and operational work at scale.

Security tools

- AWS Identity and Access Management (IAM): A service for managing permissions and controlling access to AWS resources.
- AWS Key Management Service (KMS): A service for managing and encrypting data encryption keys.
- AWS Shield: A managed security service for protecting web applications from DoS attacks.
- AWS Inspector: A service for assessing the security status of AWS EC2 instances.
- AWS WAF: A web application firewall for protecting web applications from common web attacks.

Other tools

- AWS CloudFormation: A service for creating and managing AWS infrastructure using templates.
- AWS Serverless Application Model (SAM): A framework for building serverless applications on AWS.
- AWS Lambda: A serverless computing service that lets you run code without provisioning or managing servers.
- Amazon Relational Database Service (RDS): A fully managed service that makes it easy to set up, operate, and scale a relational database.
- Amazon Simple Storage Service (S3): A highly scalable, object storage service for storing and retrieving any amount of data from anywhere on the web.

These are just a few of the many tools available in AWS. For a complete list, please visit the AWS website: <https://aws.amazon.com/products/>

AWS tools can be used to build and deploy a wide range of applications, including web apps, mobile apps, serverless applications, and machine learning applications. AWS tools can also be used to manage your cloud environment, secure your data, and monitor your applications.

Here are some examples of how AWS tools can be used:

- A developer can use AWS Amplify to build a mobile app and AWS CodeDeploy to deploy it to AWS Lambda.
- A system administrator can use AWS CloudFormation to create a new VPC and AWS CloudWatch to monitor its performance.
- A security engineer can use AWS IAM to create IAM roles and policies to control access to AWS resources and AWS WAF to protect web applications from common web attacks.
- A data scientist can use Amazon SageMaker to build and train machine learning models and Amazon Elastic Container Service (Amazon ECS) to deploy them.

AWS tools can be used to solve a wide range of problems. Whether you are building a new application, managing your cloud environment, or securing your data, AWS has a tool that can help you.

4.2.2 About Services

AWS offers a wide range of services, including:

Compute services

- Amazon Elastic Compute Cloud (Amazon EC2): A scalable computing service that provides secure and resizable compute capacity in the cloud.
- Amazon Elastic Beanstalk: A platform for developing and deploying web applications in the cloud.
- AWS Fargate: A serverless computing service that runs containers without provisioning or managing servers.
- AWS Lambda: A serverless computing service that lets you run code without provisioning or managing servers.
- AWS Elastic Container Service (Amazon ECS): A container orchestration service that helps you run containerized applications at scale.
- Amazon Elastic Kubernetes Service (Amazon EKS): A managed Kubernetes service that makes it easy to deploy, manage, and scale Kubernetes applications.

Storage services

- Amazon Simple Storage Service (Amazon S3): A highly scalable, object storage service for storing and retrieving any amount of data from anywhere on the web.
- Amazon Elastic Block Store (Amazon EBS): A block storage service for use with Amazon EC2 instances.
- Amazon Elastic File System (Amazon EFS): A scalable, shared file system for use with Amazon EC2 instances.

Database services

- Amazon Relational Database Service (RDS): A fully managed service that makes it easy to set up, operate, and scale a relational database.
- Amazon Aurora: A managed, MySQL- and PostgreSQL-compatible relational database built for the cloud.
- Amazon DynamoDB: A fully managed, multi-region, multi-master, durable database with built-in security, backup and restore, and in-memory caching for internet-scale applications.
- Amazon Neptune: A fully managed graph database service that makes it easy to store and query graph data.

Networking services

- Amazon Virtual Private Cloud (Amazon VPC): A service that lets you create a private network in the cloud.
- Amazon Route 53: A domain name system (DNS) service that lets you manage your domain names and direct traffic to your AWS resources.
- AWS Load Balancing: A service that distributes traffic across multiple AWS resources.
- AWS CloudFront: A content delivery network (CDN) service that helps you deliver content to users around the world with low latency and high availability.

Analytics services

- Amazon Redshift: A fully managed, petabyte-scale data warehouse service that makes it easy to analyze all your data.
- Amazon Athena: An interactive query service that makes it easy to analyze data in Amazon S3 using standard SQL.
- Amazon Kinesis: A managed streaming data service that makes it easy to collect, process, and store streaming data.
- Amazon Elasticsearch Service: A fully managed, Elasticsearch-compatible search and analytics engine.

Machine learning services

- Amazon SageMaker: A fully managed platform for building, training, and deploying machine learning models.
- Amazon Rekognition: An image and video analysis service that helps you detect objects, recognize scenes, and identify faces.
- Amazon Polly: A text-to-speech service that lets you turn text into realistic speech.
- Amazon Lex: A chatbot service that lets you build conversational interfaces into your applications.

Security services

- AWS Identity and Access Management (IAM): A service that helps you manage permissions and control access to AWS resources.
 - AWS Key Management Service (KMS): A service that helps you manage and encrypt data encryption keys.
 - AWS Shield: A managed security service that protects web applications from DoS attacks.
 - AWS WAF: A web application firewall that protects web applications from common web attacks.
- These are just a few of the many services available in AWS. For a complete list, please visit the AWS website: <https://aws.amazon.com/products/>

AWS services can be used to build and deploy a wide range of applications, including web apps, mobile apps, serverless applications, and machine learning applications. AWS services can also be used to manage your cloud environment, secure your data, and analyze your data.

Here are some examples of how AWS services can be used:

- A developer can use Amazon EC2 to host their web application and Amazon S3 to store their static content.
- A data scientist can use Amazon Redshift to build a data warehouse and Amazon Athena to query the data in the data warehouse.
- A security engineer can use AWS IAM to create IAM roles and policies to control access to AWS resources and AWS WAF to protect web applications from common web attacks.
- A machine learning engineer can use Amazon SageMaker to build, train, and deploy machine learning models.

AWS services can be used to solve a wide range of problems. Whether you are building a new application, managing your cloud environment, or securing your data, AWS has a tool that can help you.

V Conclusion

AWS offers a wide range of tools and services for developing, deploying, managing, and securing cloud applications. From compute and storage services to networking and analytics services, AWS has a service for virtually every need. AWS tools and services are highly scalable and reliable, making them ideal for businesses of all sizes. AWS also offers a variety of pricing options, so businesses can choose the plan that best fits their budget and needs. Here is a summary of the key benefits of AWS tools and services:

- Scalability: AWS tools and services are highly scalable, so businesses can easily scale their applications up or down as needed.
- Reliability: AWS tools and services are highly reliable, with a 99.99% uptime SLA.
- Security: AWS tools and services are designed to be secure, with a variety of features to protect data and applications.
- Cost-effectiveness: AWS offers a variety of pricing options, so businesses can choose the plan that best fits their budget and needs.

Overall, AWS tools and services are a powerful and versatile suite of cloud computing solutions. Whether you are a small business or a large enterprise, AWS has the tools and services you need to build, deploy, manage, and secure your cloud applications.

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