

Amazon Cloud Platform

Clusters, Grids and Cloud Computing Systems

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Amazon Web Service (AWS)

The platform is known as Amazon Web Services (AWS), which provides on-demand computing resources and services in the cloud, with pay-as-you-go pricing. For example, users can run a server on AWS that one can log on to, configure, secure, and run just as one would a server in his local space. AWS is a public cloud service provider and started their journey in 2006.

Functionality of AWS

- Store public or private data.
- A static website can be hosted in the Amazon web server. These websites use client-side technologies (such as HTML, CSS, and JavaScript) to display content that doesn't change frequently.
- Host a dynamic website, or web app. These websites include classic three-tier applications, with web, application, and database tiers.
- Support students or online training programs.
- Process business and scientific data.
- Handle peak loads.

Clients of AWS



Figure: Startups as well as traditional applications use AWS

Regions

Amazon has set up data centers in different continents of the world. Correspondingly, AWS products are available to use in different regions. In order to place your application to the target users, one can choose any of the 16 regions Amazon has, but the prices for AWS usage vary by region. Each region contains multiple distinct locations called Availability Zones. Each Availability Zone is engineered to be isolated from failures in other Availability Zones, and to provide inexpensive, low latency network connectivity to other zones in the same region. By placing resources in separate Availability Zones, you can protect your website or app from the failure of a single location. AWS resources can be tied to a region or tied to an

Availability Zone. Not every region or Availability Zone supports every AWS resource. When a user views their resources, he can only see the resources tied to the region you've specified. This is because regions are isolated from each other, and not replicated across regions automatically. Name and code of some regions in given below:

Name Region	Code
Asia Pacific (Seoul)	ap-northeast-2
Asia Pacific (Singapore)	ap-southeast-1
Asia Pacific (Sydney)	ap-southeast-2
Asia Pacific (Tokyo)	ap-northeast-1
EU (Frankfurt)	eu-central-1
EU (Ireland)	eu-west-1
South America (São Paulo)	sa-east-1
US East (N. Virginia)	us-east-1
US West (N. California)	us-west-1
US West (Oregon)	us-west-2

Amazon Web Platform

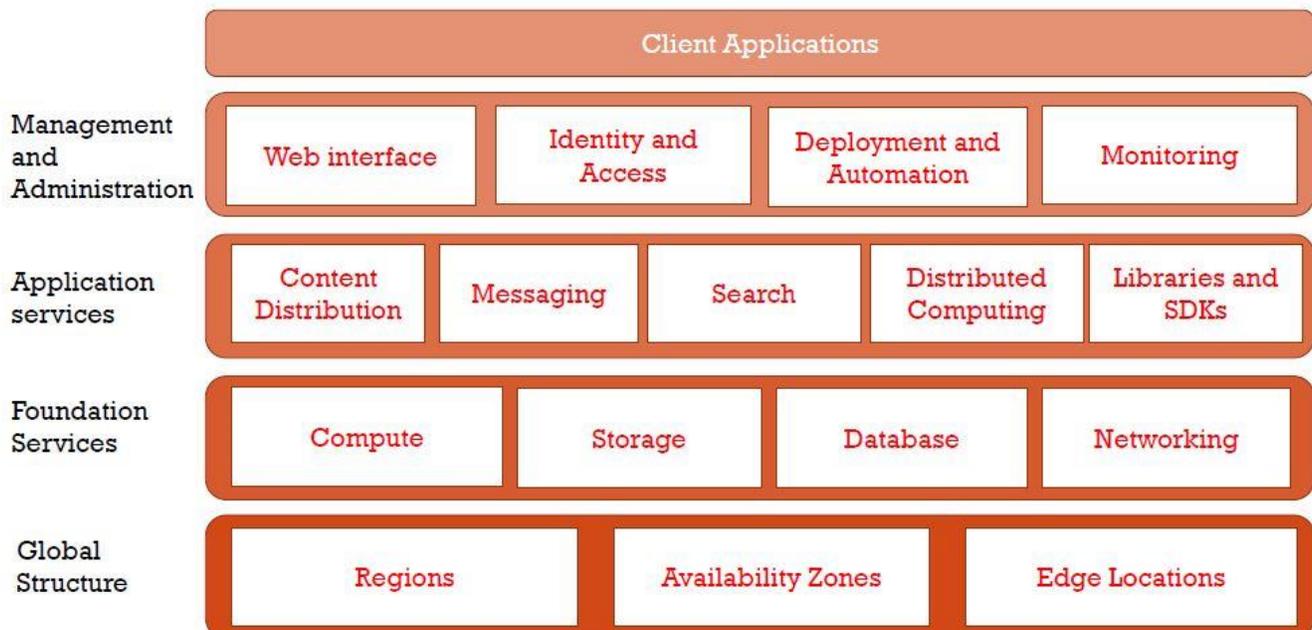


Figure: AWS Platform (different types of services)

1. Compute and Networking Services for AWS

AWS provides a variety of computing and networking services to meet the needs of your applications. You can provision virtual servers, set up a firewall, configure Internet access, allocate and route IP addresses, and scale your infrastructure to meet increasing demand. You can use the compute and networking services with the storage, database, and application services to provide a complete solution for computing, query processing, and storage across a wide range of applications.

The following are the key compute and networking services:

a. Amazon EC2

Provides virtual servers in the AWS cloud.

b. Amazon VPC

Provides an isolated virtual network for your virtual servers.

c. Elastic Load Balancing

Distributes network traffic across your set of virtual servers.

d. Auto Scaling

Automatically scales your set of virtual servers based on changes in demand.

e. Amazon Route 53

Routes traffic to your domain name to a resource, such as a virtual server or a load balancer.

f. AWS Lambda

Runs your code on virtual servers from Amazon EC2 in response to events.

g. Amazon ECS

Provides Docker containers on virtual servers from Amazon EC2.

2. Storage and Content Delivery Services for AWS

a. Amazon S3

Scalable storage in the AWS cloud.

b. CloudFront

A global content delivery network (CDN).

c. Amazon EBS

Network attached storage volumes for virtual servers.

d. Amazon Glacier

Low-cost archival storage.

3. Database Services for AWS

a. Amazon RDS

Provides managed relational databases.

b. Amazon Redshift

A fast, fully-managed, petabyte-scale data warehouse.

c. Amazon DynamoDB

Provides managed NoSQL databases.

d. Amazon ElastiCache

An in-memory caching service.

4. Application Services for AWS

a. Amazon AppStream

To host an application in the AWS cloud and stream the input and output to users' devices.

b. Amazon CloudSearch

Add search to a website.

c. Amazon Elastic Transcoder

Convert digital media into the formats required by users' devices.

d. Amazon SES

Send email from the cloud.

e. Amazon SNS

Send or receive notifications from the cloud.

f. Amazon SQS

Enable components in your application to store data in a queue to be retrieved other components.

g. Amazon SWF

Coordinate tasks across the components of your application.

Benefits

- 1. On the Go Pricing:** Amazon supports pricing as one adds more resources to their account. This makes a lot of sense for server infrastructure, as traffic tends to be very bursty, especially the larger the site is. Traditional hardware, for the most part, goes unutilized for 90% of its lifecycle. AWS helps deal with this problem by keeping it cheap during the slow times.
- 2. The Free Tier:** The biggest reason many people do not use AWS is lack of knowledge. EC2 is not like a traditional hosted solution, as it's designed to bring servers online and offline very quickly as needed. Because of this, many IT professionals were leery of using EC2 (or the rest of the AWS suite) because of the cost associated with "playing around" to figure it out. The free tier, which provides enough credit to run an EC2 micro instance 24/7 all month, resolves this. It comes with S3 storage, EC2 compute hours, Elastic Load Balancer time, and much more. This gives developers a chance to try out AWS's API in their software, which not only enhances their software, but also ties them to AWS, which benefits Amazon in the long run.
- 3. Performance:** There's no denying the speed of AWS. The Elastic Block Storage is nearly as fast as S3, but provides different features. EC2 Compute Units give Xeon-class performance on an hourly rate. The reliability is better than most private data centers in the world, and if there is a problem, you're usually still online, but with reduced capacity.
- 4. Deployment Speed:** If you've ever had to provision a hosted web service, you know this pain very well. Traditional providers take anywhere from 48-96 hours to provision a server. Then you have to spend a few hours tweaking it and getting everything tested. AWS shrinks that deployment time to minutes. If you utilize their Amazon Machine Images, you can have a machine deployed and ready to accept connections in that short amount of time. This is important when, for example, you are running a promotion that generates tons of traffic at specific intervals, or just need the flexibility to handle the demand when a new product launches.

5. **Security:** Access to the AWS resources can be restricted using the IAM (Identity and Access Management), using the roles in IAM we can define the privileges for user actions which greatly reduces any malpractices. AWS also provides VPC, which can be used to host our services on a private network which is not accessible from the internet, but can communicate with the resources in the same network. This restricts the access to the resources such that any ill-intentioned user from the internet.
6. **Flexibility:** The most important feature in AWS is its flexibility. All the services work and communicate together with your application to automatically judge demand and handle it accordingly. Combined with the fantastic API and the Amazon Machine Images you create, you can have a completely customized solution that provisions a server instance in under 10 minutes, and is ready to accept connections once it comes online. Then you can quickly shut down instances when they are no longer needed, making server management a thing of the past.

Problems

- The learning curve for a software-defined data center is sometimes steep for larger enterprises.
- Billing is extremely confusing; NPI recommends going through a reseller for a more detailed monthly bill.
- AWS does not include enterprise-grade support by default. Customers will need to buy Business tier support for this, which carries up to a 10% premium on the customer's overall AWS spend.
- Almost all enterprise customers require a custom agreement (vs. the click-through agreement online), and significant terms-and-conditions negotiation
- Have experienced high profile outages in recent history

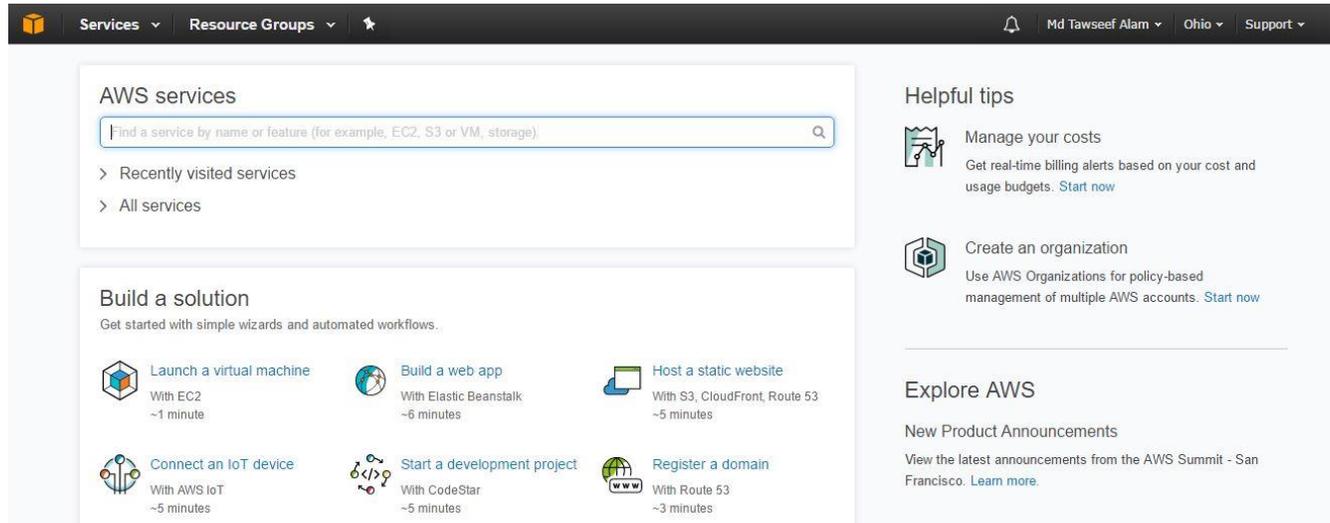
Price Overview

Public cloud provider	Instance size	Memory allocation	Disk space	CPU	Compute unit capacity	Price
Google	f1-micro	615 MB RAM	1000 GB HDD	1 vCPU	~ 0.5 ECU	\$46.05
Microsoft Azure	Basic A0	768 MB RAM	20 GB + 980 GB HDD	1 vCPU	~ 0.95 ECU	\$61.96
AWS	EC2 Micro t1.micro + 1000 GB EBS	613 MB RAM	1000 GB HDD	1 vCPU	~ 0.5 ECU	\$64.40

From the price overview above we can see that AWS is more costly than two other providers. However, AWS has more clients than the other two, it is because the effectiveness of services that AWS provides is more. The comparison has been done on some specific criteria, but if we consider deployment time and cost or any other scope AWS has much more elasticity than other available technologies on the market.

AWS Management Console

The AWS management console provides a variety of services. It is well decorated and user-friendly. It guides a new user through each resource and the billing procedure of each resource. For example, One can deploy a website in 10-15 minutes by following the instructions given on the console. There are also detailed tutorials to get acquainted with the



management console.

Figure: AWS Management Console (EC2)

Conclusion

Amazon has built a series of services on the cloud. They have provided a free tier for new users to learn and practice these services. Their quality of service and user satisfaction has led them to a benchmark, where now many startups have begun and traditional companies have transferred their application to the cloud.

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