Amazon Web Services

Amazon Web Services is a subsidiary of Amazon providing on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered pay-as-you-go basis. These cloud computing [web services](https://en.wikipedia.org/wiki/Web_services) provide a variety of basic abstract technical infrastructure and [distributed computing](https://en.wikipedia.org/wiki/Distributed_computing) building blocks and tools. Amazon Web Services offers reliable, scalable, and inexpensive cloud computing services.

**AWS Products and Services**

As of 2020, AWS comprises more than 175 products and services including [computing](https://en.wikipedia.org/wiki/Computation), [storage](https://en.wikipedia.org/wiki/Storage_virtualization), [networking](https://en.wikipedia.org/wiki/Computer_network), [database](https://en.wikipedia.org/wiki/Database), [analytics](https://en.wikipedia.org/wiki/Analytics), [application services](https://en.wikipedia.org/wiki/Application_service_provider), [deployment](https://en.wikipedia.org/wiki/Software_deployment), [management](https://en.wikipedia.org/wiki/Systems_management), [mobile](https://en.wikipedia.org/wiki/Mobile_application_development), [developer tools](https://en.wikipedia.org/wiki/Programming_tool), and tools for the [Internet of Things](https://en.wikipedia.org/wiki/Internet_of_Things). Most services are not exposed directly to end users, but instead offer functionality through APIs for developers to use in their applications. Amazon Web Services' offerings are accessed over [HTTP](https://en.wikipedia.org/wiki/HTTP), using the [REST](https://en.wikipedia.org/wiki/Representational_State_Transfer) architectural style and [SOAP](https://en.wikipedia.org/wiki/SOAP_(protocol)) protocol for older APIs and exclusively [JSON](https://en.wikipedia.org/wiki/JSON) for newer ones.

* 1. **AWS Compute**

AWS offer the broadest choice of compute services with the deepest functionality, more than any other cloud provider. We are the only cloud provider with compute instances that deliver 100 Gbps of ethernet networking. With On-Demand pricing, you pay only for the compute you need with no long-term commitments.

# Amazon Lightsail:

* Virtual servers, storage, databases, and networking for a low, predictable price.
* Lightsail is an easy-to-use cloud platform that offers you everything needed to build an application or website, plus a cost-effective, monthly plan.
* Lightsail is ideal for simpler workloads, quick deployments, and getting started on AWS. It’s designed to help you start small, and then scale as you grow.

# AWS Batch:

### Fully managed batch processing at any scale.

* AWS Batch enables developers, scientists, and engineers to easily and efficiently run hundreds of thousands of batch computing jobs on AWS.
* AWS Batch dynamically provisions the optimal quantity and type of compute resources (e.g., CPU or memory optimized instances) based on the volume and specific resource requirements of the batch jobs submitted.
* With AWS Batch, there is no need to install and manage batch computing software or server clusters that you use to run your jobs, allowing you to focus on analyzing results and solving problems.
* AWS Batch plans, schedules, and executes your batch computing workloads across the full range of AWS compute services and features, such as [Amazon EC2](https://aws.amazon.com/ec2/) and [Spot Instances](https://aws.amazon.com/ec2/spot/).

# AWS Elastic Beanstalk:

* AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS.
* You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring.
* At the same time, you retain full control over the AWS resources powering your application and can access the underlying resources at any time.
* There is no additional charge for Elastic Beanstalk - you pay only for the AWS resources needed to store and run your applications.

# AWS Lambda:

### Run code without thinking about servers. Pay only for the compute time you consume.

* AWS Lambda lets you run code without provisioning or managing servers.
* You pay only for the compute time you consume.
* With Lambda, you can run code for virtually any type of application or backend service all with zero administration.
* Just upload your code and Lambda takes care of everything required to run and scale your code with high availability.
* You can set up your code to automatically trigger from other AWS services or call it directly from any web or mobile app.
  1. **AWS Networking**

AWS provides the broadest and deepest set of networking services with the highest reliability, most security features, and highest performance in the world. This helps ensure you can run any kind of workload you have in the cloud. Security at AWS starts with our core infrastructure. AWS Networking capabilities are designed to meet the most stringent security requirements in the world.

# Amazon Virtual Private Cloud:

* Amazon Virtual Private Cloud (Amazon VPC) lets you provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define.
* You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.
* You can use both IPv4 and IPv6 in your VPC for secure and easy access to resources and applications.
* You can easily customize the network configuration of your Amazon VPC.

# Amazon API Gateway:

* Amazon API Gateway is a fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale.
* APIs act as the "front door" for applications to access data, business logic, or functionality from your backend services.
* Using API Gateway, you can create RESTful APIs and WebSocket APIs that enable real-time two-way communication applications.
* API Gateway supports containerized and serverless workloads, as well as web applications.

# AWS Global Accelerator:

* AWS Global Accelerator is a networking service that sends your user’s traffic through Amazon Web Service’s global network infrastructure, improving your internet user performance by up to 60%.
* When the internet is congested, Global Accelerator’s automatic routing optimizations will help keep your packet loss, jitter, and latency consistently low.
* With Global Accelerator, you are provided two global static customer facing IPs to simplify traffic management.
* On the back end, add or remove your AWS application origins, such as Network Load Balancers, Application Load Balancers, Elastic IPs, and EC2 Instances, without making user facing changes.

# AWS App Mesh:

### Application-level networking for all your services.

* AWS App Mesh is a service mesh that provides application-level networking to make it easy for your services to communicate with each other across multiple types of compute infrastructure.
* App Mesh standardizes how your services communicate, giving you end-to-end visibility and ensuring high-availability for your applications.
* AWS App Mesh makes it easy to run services by providing consistent visibility and network traffic controls for services built across multiple types of compute infrastructure.
  1. **AWS Storage**

AWS offers a complete range of services for you to store, access, govern, and analyze your data to reduce costs, increase agility, and accelerate innovation. Select from object storage, file storage, and block storage services, backup, and data migration options to build the foundation of your cloud IT environment.

# Amazon Elastic File System:

* Amazon Elastic File System (Amazon EFS) provides a simple, scalable, fully managed elastic NFS file system 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, eliminating the need to provision and manage capacity to accommodate growth.
* Amazon EFS offers two storage classes: the Standard storage class, and the [Infrequent Access storage class](https://aws.amazon.com/efs/features/infrequent-access/) (EFS IA).
* Amazon EFS transparently serves files from both storage classes in a common file system namespace.

# Amazon FSx for Lustre:

* Amazon FSx for Lustre is a fully managed service that provides cost-effective, high-performance storage for compute workloads.
* Powered by Lustre, the world's most popular high-performance file system, FSx for Lustre offers sub-millisecond latencies, up to hundreds of gigabytes per second of throughput, and millions of IOPS.
* It provides multiple deployment options and storage types to optimize cost and performance for your workload requirements.
* FSx for Lustre file systems can also be linked to Amazon S3 buckets, allowing you to access and process data concurrently from both a high-performance file system and from the S3 API.

# Amazon S3 Glacier:

* Amazon S3 Glacier and S3 Glacier Deep Archive are a secure, durable, and extremely low-cost Amazon S3 cloud storage classes for data archiving and long-term backup.
* Customers can store data for as little as $1 per terabyte per month, a significant savings compared to on-premises solutions.
* To keep costs low yet suitable for varying retrieval needs, Amazon S3 Glacier provides three options for access to archives, from a few minutes to several hours, and S3 Glacier Deep Archive provides two access options ranging from 12 to 48 hours.
* **AWS Backup:**
* It is a fully managed backup service that makes it easy to centralize and automate the backup of data across AWS services.
* Using AWS Backup, you can centrally configure backup policies and monitor backup activity for AWS resources, such as Amazon EBS volumes, Amazon EC2 instances, Amazon RDS databases, Amazon DynamoDB tables, Amazon EFS file systems, and AWS Storage Gateway volumes.
* AWS Backup automates and consolidates backup tasks previously performed service-by-service, removing the need to create custom scripts and manual processes.
* AWS Backup provides a fully managed, policy-based backup solution, simplifying your backup management, enabling you to meet your business and regulatory backup compliance requirements.
  1. **AWS Databases**

AWS databases are built for business-critical, enterprise workloads, offering high availability, reliability, and security. These databases support multi-region, multi-master replication, and provide full oversight of your data with multiple levels of security, including network isolation using Amazon VPC, encryption at rest using keys you create and control through AWS Key Management Service (KMS), as well as encryption-in-transit.

# Amazon Aurora:

* Amazon Aurora is a MySQL and PostgreSQL-compatible [relational database](https://aws.amazon.com/relational-database/) built for the cloud, that combines the performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open source databases.
* Amazon Aurora is up to five times faster than standard [MySQL](https://aws.amazon.com/rds/mysql/what-is-mysql/) databases and three times faster than standard PostgreSQL databases.
* It provides the security, availability, and reliability of commercial databases at 1/10th the cost.
* Amazon Aurora is fully managed by [Amazon Relational Database Service (RDS)](https://aws.amazon.com/rds/), which automates time-consuming administration tasks like hardware provisioning, database setup, patching, and backups.

# Amazon DynamoDB:

* Amazon DynamoDB is a key-value and document database that delivers single-digit millisecond performance at any scale.
* It's a fully managed, multiregion, multimaster, durable database with built-in security, backup and restore, and in-memory caching for internet-scale applications.
* DynamoDB can handle more than 10 trillion requests per day and can support peaks of more than 20 million requests per second.
* Many of the world's fastest growing businesses such as Lyft, Airbnb, and Redfin as well as enterprises such as Samsung, Toyota, and Capital One depend on the scale and performance of DynamoDB to support their mission-critical workloads.

# Amazon Redshift:

* Most popular and fastest cloud data warehouse.
* Companies like Lyft have grown with Redshift from startups to multi-billion dollar enterprises.
* With Redshift you can query petabytes of structured and semi-structured data across your data warehouse, operational database, and your data lake using standard SQL.
* Redshift lets you easily save the results of your queries back to your S3 data lake using open formats like Apache Parquet to further analyze from other analytics services like Amazon EMR, Amazon Athena, and Amazon SageMaker.

# Amazon ElastiCache:

### Fully managed in-memory data store, compatible with Redis or Memcached.

### Power real-time applications with sub-millisecond latency.

### Amazon ElastiCache allows you to seamlessly set up, run, and scale popular open-Source compatible in-memory data stores in the cloud.

### Build data-intensive apps or boost the performance of your existing databases by retrieving data from high throughput and low latency in-memory data stores.

### Amazon ElastiCache is a popular choice for real-time use cases like Caching, Session Stores, Gaming, Geospatial Services, Real-Time Analytics, and Queuing.

* Amazon ElastiCache offers fully managed [Redis](https://aws.amazon.com/redis/) and [Memcached](https://aws.amazon.com/memcached/) for your most demanding applications that require sub-millisecond response times.

**Microsoft Azure**

**Microsoft Azure**, commonly referred to as **Azure**, is a [cloud computing](https://en.wikipedia.org/wiki/Cloud_computing) service created by [Microsoft](https://en.wikipedia.org/wiki/Microsoft) for building, testing, deploying, and managing applications and services through Microsoft-managed [data centers](https://en.wikipedia.org/wiki/Data_center). It provides [software as a service (SaaS)](https://en.wikipedia.org/wiki/Software_as_a_service), [platform as a service (PaaS)](https://en.wikipedia.org/wiki/Platform_as_a_service) and [infrastructure as a service (IaaS)](https://en.wikipedia.org/wiki/Infrastructure_as_a_service) and supports many different [programming languages](https://en.wikipedia.org/wiki/Programming_language), tools, and frameworks, including both Microsoft-specific and third-party software and systems.

**Azure Products and Services**

Azure uses large-scale virtualization at Microsoft datacenters worldwide and is offers more than 600 services. For better understanding, let’s categorize them into domains as follows:

1. **Azure Compute**

These services enable a user to deploy and manage VMs, containers and [batch jobs](https://searchdatacenter.techtarget.com/definition/batch), as well as support remote application access. Compute resources created within the Azure cloud can be configured with either public [IP addresses](https://searchwindevelopment.techtarget.com/definition/IP-address) or private IP addresses, depending on whether the resource needs to be accessible to the outside world. It access cloud compute capacity and scale on demand and only pay for the resources you use.

* [**Azure Virtual Machine**](https://intellipaat.com/blog/tutorial/microsoft-azure-tutorial/constructing-azure-virtual-machine/):
* It is an environment that allows the user to have a similar experience as that of while using dedicated hardware.
* Helps to create Linux and Windows virtual machines (VMs) in seconds and reduce costs.
* Helps to keep your budget in check with low-cost, per-second billing. You only pay for the compute time you use.
* Scale from one to thousands of VM instances in minutes with VM Scale Sets.
* Encrypt sensitive data, protect VMs from malicious threats, secure network traffic and meet regulatory and compliance requirements.
* **Azure Functions:**
* An event-driven serverless compute platform that can also solve complex orchestration problems.
* It doesn’t have a server and lets you run code-on-demand without infrastructure.
* Build and debug locally without additional setup, deploy and operate at scale in the cloud and integrate services using triggers and bindings.
* Automated and flexible scaling based on your workload volume, keeping the focus on adding value instead of managing infrastructure.
* Integrated programming model based on triggers and bindings that help you respond to events and seamlessly connect to other services.

# Azure Spring Cloud:

* Fully managed Spring Cloud service, jointly built and operated with VMware.
* Use Spring Cloud to bring modern microservice patterns to Spring Boot and Steeltoe .NET Core apps, eliminating boilerplate code to quickly develop robust apps in the cloud.
* Fully managed microservice development with built-in service discovery and configuration management.
* Joint engineering, operation, and integrated support by Microsoft and VMware.
* Quickly troubleshoot or identify bottlenecks with Azure Monitor. Easily build your Java applications, from source to container, with the fully integrated VMware Tanzu Build Service.

# Azure Kubernetes Service (AKS):

* Highly available, secure and fully managed Kubernetes service.
* Deploy and manage containerised applications more easily with a fully managed Kubernetes service.
* Azure Kubernetes Service (AKS) offers serverless Kubernetes, an integrated continuous integration and continuous delivery (CI/CD) experience and enterprise-grade security and governance.
* Unite your development and operations teams on a single platform to rapidly build, deliver and scale applications with confidence.
* [Elastic provisioning](https://azure.microsoft.com/en-in/services/container-instances/) of capacity without the need to manage the infrastructure and with the ability to add event-driven autoscaling and triggers through [KEDA](https://github.com/kedacore/keda) .
* Faster end-to-end development experience through [Visual Studio Code Kubernetes tools](https://marketplace.visualstudio.com/items?itemName=ms-kubernetes-tools.vscode-kubernetes-tools), [Azure DevOps](https://azure.microsoft.com/en-in/services/devops/) and [Azure Monitor](https://azure.microsoft.com/en-in/services/monitor/) .

1. **Azure Networking**

This group includes [virtual networks](https://searchservervirtualization.techtarget.com/definition/network-virtualization), dedicated connections and [gateways](https://internetofthingsagenda.techtarget.com/definition/gateway), as well as services for traffic management and diagnostics, load balancing, domain name, DNS hosting and network protection against distributed denial-of-service ([DDoS](https://searchsecurity.techtarget.com/definition/distributed-denial-of-service-attack)) attacks. It connects cloud and on-premises infrastructure and services to provide your customers and users the best possible experience. These networks allow enterprises to safely connect to their cloud resources through Azure ExpressRoute.

* **Azure Virtual Network:**
* It performs network isolation and segmentation with filters which routes the traffic.
* It comprises of Azure Connect which allows easy setup of IP-based and Azure Traffic Manager.
* Build a hybrid infrastructure that you control.
* Bring your own IP addresses and DNS servers.
* Secure your connections with an IPsec VPN or ExpressRoute.
* Get granular control over traffic between subnets.
* Create sophisticated network topologies using virtual appliances.
* Get an isolated and highly-secure environment for your applications.
* **Azure Load Balancer**:
* It balances a load of traffic going to virtual machines and isolates the external traffic to another virtual machine.
* Deliver high availability and network performance to your applications.
* Instantly add scale to your applications .
* Load balance Internet and private network traffic .
* Improve application reliability via health checks .
* Flexible NAT rules for better security .
* Directly integrated into virtual machines and cloud services.
* Native IPv6 support.
* **Content Delivery Network (CDN)**:
* It helps in improving delivering the content and allows the streaming of content by using the location of 24 different locations that are distributed throughout the world.
* Secure and reliable global content delivery and acceleration.
* Azure Content Delivery Network (CDN) lets you reduce load times, save bandwidth and speed responsiveness whether you are developing or managing websites or mobile apps or encoding and distributing streaming media, gaming software, firmware updates or IoT endpoints.
* Global coverage and massive scalability. Integrated into your Azure services, letting you scale in minutes.
* Simple setup and no commitment: pay-as-you-go.

# Azure DDoS Protection:

* Protect your Azure resources from Distributed Denial of Service (DDoS) attacks.
* Always-on monitoring and automatic network attack mitigation.
* Adaptive tuning based on platform insights in Azure.
* Application layer protection with Azure Application Gateway Web Application Firewall.
* Integration with Azure Monitor for analytics and insights.
* Protection against the unforeseen costs of a DDoS attack.

1. **Azure Storage**

This category of services provides scalable cloud storage for structured and unstructured data. It also supports big data projects, [persistent storage](https://searchstorage.techtarget.com/definition/Persistent-storage) and archival storage. [Azure storage](https://intellipaat.com/blog/tutorial/microsoft-azure-tutorial/azure-storage/) provides storage solutions that are more durable and you can build large-scale applications, and still scale higher if needed, and it automatically balances the data based on traffic.

* [**Azure Blob Storage**](https://intellipaat.com/blog/tutorial/microsoft-azure-tutorial/azure-blob-storage/)**:**
* Azure follows storage in terms of binary large objects (BLOBs) with blob service.
* It gives users the ability to describe their data by adding metadata.
* Massively scalable and secure object storage for cloud-native workloads, unstructured data , archives, data lakes, high-performance computing and machine learning.
* Azure Blob Storage helps you create data lakes for your analytics needs and provides storage to build powerful cloud-native and mobile apps.
* Optimise costs with tiered storage for your long-term data and flexibly scale up for high-performance computing and machine learning workloads.
* **Azure File Storage**:
* It offers file sharing in the cloud using standard protocol.
* Simple, secure and serverless enterprise-grade cloud file shares.
* Fully managed file shares in the cloud that are accessible via the industry-standard SMB and NFS protocols.
* Azure file shares can be mounted concurrently by cloud or on-premises deployments of Windows, Linux and macOS.
* Azure file shares can also be cached on Windows Servers with Azure File Sync for fast access near where the data is being used.
* Simple, distributed, cross-platform file system. Lift and shift migration. Simple and inexpensive. Move data to cloud with no coding.

## Data Lake Storage:

* Secure, massively scalable data lake storage for your high-performance analytics workloads.
* Limitless storage for analytics data.
* Optimised for Apache Spark and Hadoop analytics engines.
* High-performance file system with support for fine-grained ACLs.
* Eliminate data silos with a single storage platform.
* Optimise costs with tiered storage and policy management.
* Authenticate data using Azure Active Directory (Azure AD) and role-based access control (RBAC). And help protect data with security features like encryption at rest and advanced threat protection.

# Azure NetApp Files:

* Enterprise file storage, powered by NetApp.
* Azure NetApp Files makes it easy for enterprise line-of-business (LOB) and storage professionals to migrate and run complex, file-based applications with no code change.
* Azure NetApp Files is widely used as the underlying shared file-storage service in various scenarios.
* These include migration (lift and shift) of POSIX-compliant Linux and Windows applications, SAP HANA, databases, high-performance compute (HPC) infrastructure and apps and enterprise web applications.

1. **Azure Database**

This category includes Database as a Service ([DBaaS](https://searchdatamanagement.techtarget.com/definition/database-as-a-service-DBaaS)) offerings for SQL and NoSQL, as well as other database instances such as Azure Cosmos DB and Azure Database for PostgreSQL. It also includes [Azure SQL Data Warehouse](https://searchsqlserver.techtarget.com/definition/Azure-SQL-Data-Warehouse) support, [caching](https://whatis.techtarget.com/definition/caching) and hybrid database integration and migration features. Azure SQL is the platform's flagship database service. It is a relational database that provides SQL functionality without the need for deploying a SQL server.

* [**Azure SQL Database**](https://intellipaat.com/blog/tutorial/microsoft-azure-tutorial/azure-sql/)**:**
* It is a relational database hosted in Azure and built on SQL server technologies.
* It provides a scalable, highly available, and fault-tolerant database.
* Azure SQL Database is the intelligent, scalable, relational database service built for the cloud.
* It is evergreen and always up to date, with AI-powered and automated features that optimise performance and durability for you.
* Serverless compute and Hyperscale storage options automatically scale resources on demand, so you can focus on building new applications without worrying about storage size or resource management.
* **Azure Redis Cache**:
* It is a data structure that implements a key-value database with optional durability.
* Lightning-fast and fully managed in-memory data store.
* As traffic and demands on your app increase, scale performance simply and cost-effectively.
* Superior throughput and performance to handle millions of requests per second with sub-millisecond latency.
* Fully managed service with automatic patching, updates, scaling and provisioning so you can focus on development.

# Azure Cosmos DB:

* Fast NoSQL database with open APIs for any scale.
* Azure Cosmos DB is a fully managed NoSQL database service for modern app development.
* Fast writes and reads anywhere in the world with turnkey multi-master global distribution.
* Guaranteed speed at any scale-even through bursts-with instant, limitless elasticity, fast reads and multi-master writes, anywhere in the world.
* Fully managed and cost-effective serverless database with instant, automatic scaling that responds to application needs.

**AWS vs Azure vs Google Cloud**

Here are some of the differences between the three cloud service providers.

|  |  |  |
| --- | --- | --- |
| **AWS** | **Microsoft Azure** | **Google Cloud Platform** |
| 12 years old | 7 years old | 6 years old |
| Amazon S3 is mostly used for secondary backup | Backup is built into Azure | Does not provide any backup |
| Gives managed virtual tape infrastructure across hybrid environments | Enterprise-grade hybrid cloud storage | It relies on partners like Egnyte |
| Dominant market position | Second largest provider | Recently launched and new |
| Pricing is per hour | Pricing is per minute | Pricing is per minute |