* **S3 (SIMPLE STORAGE SERVICE)**

Amazon Simple Storage Service (S3) is a cloud storage service provided by Amazon Web Services (AWS). It's a highly scalable and durable storage solution designed to store and retrieve data, ranging from small files to large datasets, in a secure and efficient manner.

* **S3 storage class Types :**

**1. \*\*S3 Standard**:\*\* -- This is your go-to storage for everyday use. It's fast and reliable, meant for frequently accessed data like files, images, and backups.

**2. \*\*S3 Intelligent-Tiering:\*\*** -- This class is smart – it automatically moves files between two tiers: one for things you use a lot and another for things you don't use often. Saves you money without effort.

**3. \*\*S3 One Zone-IA (Infrequent Access):\*\*** -- Like Standard, but it stores data in a single zone. Good for stuff you don't need often and can recreate if lost.

**4. \*\*S3 Glacier:\*\*** -- is the least expensive storage option in S3, but it is strictly designed for archival storage because it takes longer to access the data. Glacier offers variable retrieval rates that range from minutes to hours.

**5. \*\*S3 Glacier Deep Archive:\*\* --** This is the "storage basement." You put things here that you rarely, if ever, need. It takes more time to retrieve stuff, but it's super affordable.

**6. \*\*S3 Outposts:\*\* --** This is like having a special S3 storage space in your own place, if you have an AWS Outpost. You can keep things close and private.

Each storage class has its own purpose and cost, so you can choose the one that fits what you need to store and how often you need to access it.

* **Amazon S3 use cases**

Amazon S3 can be used by organizations ranging in size from small businesses to large enterprises. S3's scalability, availability, security and performance capabilities make it suitable for a variety of data storage use cases. Common use cases for S3 include the following:

* data archiving;
* application [hosting](https://www.techtarget.com/searchstorage/definition/cloud-hosting) for deployment, installation and management of web apps;
* software delivery;
* data backup;
* disaster recovery ([DR](https://www.techtarget.com/searchdisasterrecovery/definition/disaster-recovery));
* running [big data analytics](https://www.techtarget.com/searchbusinessanalytics/definition/big-data-analytics) tools on stored data;
* mobile applications;
* internet of things ([IoT](https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT)) devices;
* media hosting for images, videos and music files;
* **bucket** **:-** A bucket is a container for objects stored in Amazon S3. You can store any number of objects in a bucket and can have up to **100** buckets in your account. You can control who can access your buckets and objects using AWS Identity and Access Management (IAM) policies and bucket policies.
* **Objects :-** In Amazon S3 (Simple Storage Service), an "object" refers to a single piece of data that you store within a bucket. It can be any type of file, such as a document, image, video, audio file, or even software code. Objects are the fundamental units of storage in S3.
* **Keys** :- An object key (or key name) is the unique identifier for an object within a bucket. Every object in a bucket has exactly one key. The combination of a bucket, object key, and optionally, version ID (if S3 Versioning is enabled for the bucket) uniquely identify each object.
* **Versioning :-** S3 versioning is a feature in Amazon S3 (Simple Storage Service) that allows you to keep multiple versions of an object in the same bucket. This means that when you update or delete an object, instead of replacing it or removing it permanently, S3 keeps a record of the changes as different versions. This can be incredibly useful for data protection, recovery, and maintaining a history of changes
* **Version ID :**- When you enable S3 Versioning in a bucket, Amazon S3 generates a unique version ID for each object added to the bucket. Objects that already existed in the bucket at the time that you enable versioning have a version ID of null. If you modify these (or any other) objects with other operations, such as [CopyObject](https://docs.aws.amazon.com/AmazonS3/latest/API/API_CopyObject.html) and [PutObject](https://docs.aws.amazon.com/AmazonS3/latest/API/API_PutObject.html), the new objects get a unique version ID.
* **Bucket Policy :-** A "Bucket Policy" in Amazon S3 is like setting rules for who can do what with the stuff in your storage bucket. With a bucket policy, you control who can access, view, and use the files inside your S3 bucket and what they're allowed to do with them.
* **SSE-KMS :-** SSE-KMS (Server-Side Encryption with AWS Key Management Service) in Amazon S3 is a way to protect your data stored in S3 by encrypting it using keys managed by AWS Key Management Service (KMS). It's like using a special lock to secure your valuable items in a storage unit.

**CDN :-** A content delivery network (CDN) is a network of interconnected servers that speeds up webpage loading for data-heavy applications. CDN can stand for content delivery network or content distribution network.

## **AWS Global SERVICES**

## **AWS Networking Services :-**

* [Route 53](https://jayendrapatil.com/aws-route-53/) – **Global**
  + Route53 services are offered at AWS edge locations and are global
* [CloudFront](https://jayendrapatil.com/aws-cloudfront/) – **Global**
  + CloudFront is the global content delivery network (CDN) services are offered at AWS edge locations
* [Direct Connect Gateway](https://jayendrapatil.com/aws-direct-connect-gateway/) – Global
  + is a globally available resource that can be created in any Region and accessed from all other Regions.
* AWS Global Accelerator – Global
  + is a global service that supports endpoints in multiple AWS Regions.

## **AWS Identity & Security Services**

* [Identity Access Management – IAM](https://jayendrapatil.com/aws-iam-overview/)
  + Users, Groups, Roles, Accounts – **Global**
    - Same AWS accounts, users, groups, and roles can be used in all regions
  + Key Pairs – **Global** or Regional
    - EC2 created key pairs are specific to the region
    - RSA key pair can be created and uploaded that can be used in all regions
* [Web Access Firewall – WAF](https://jayendrapatil.com/aws-waf/) – **Global**
  + protect web applications from common web exploits and is offered at AWS edge locations globally.

## **AWS Regional SERVICES :-**

## **AWS Networking Services**

[Virtual Private Cloud](https://jayendrapatil.com/aws-virtual-private-cloud-vpc/)

* VPC – Regional
  + VPCs are created within a region
* Security groups – Regional
  + A security group is tied to a region and can be assigned only to instances in the same region.
* [VPC Endpoints](https://jayendrapatil.com/aws-vpc-endpoints/) – Regional
  + VPC Gateway & Interface Endpoints cannot be created between a VPC and an AWS service in a different region.
* Elastic IP Address – Regional
  + Elastic IP addresses created within the region can be assigned to instances within the region only.
* ELB, [ALB](https://jayendrapatil.com/aws-elb-application-load-balancer/), [NLB](https://jayendrapatil.com/aws-elb-network-load-balancer/), [GWLB](https://jayendrapatil.com/aws-gateway-load-balancer-gwlb/) – Regional
  + Elastic Load Balancer distributes traffic across instances in multiple Availability Zones in the same region
  + Use Route 53 to route traffic to load balancers across regions.
* [Transit Gateway](https://jayendrapatil.com/aws-transit-gateway-tgw/) – Regional
  + is a Regional resource and can connect VPCs within the same AWS Region.
  + Transit Gateway Peering can be used to attach TGWs across regions.

## **AWS Compute Services**

* [EC2](https://jayendrapatil.com/aws-ec2-overview/) Resource Identifiers – **Regional**
  + Each resource identifier, such as an AMI ID, instance ID, EBS volume ID, or EBS snapshot ID, is tied to its region and can be used only in the region where you created the resource.
* EBS Snapshot – **Regional**
  + An EBS snapshot is tied to its region and can only be used to create volumes in the same region and has to be copied from one region to another if needed.
* AMIs – **Regional**
  + AMI provides templates to launch EC2 instances
  + AMI is tied to the Region where its files are located with Amazon S3. For using AMI in different regions, the AMI can be copied to other regions
* Auto Scaling – **Regional**
  + Auto Scaling spans across multiple Availability Zones within the same region but cannot span across regions
* [ECS](https://jayendrapatil.com/aws-ec2-container-service-ecs/) – **Regional**
* [ECR](https://jayendrapatil.com/amazon-elastic-container-registry-ecr/) – **Regional**
  + Images can be pushed/pulled within the same AWS Region.
  + Images can also be pulled between Regions or out to the internet with additional latency and data transfer costs.

## **AWS Storage Services**

* [DynamoDB](https://jayendrapatil.com/aws-dynamodb-security/) – Regional
  + All data objects are stored within the same region and replicated across multiple Availability Zones in the same region
  + Data objects can be explicitly replicated across regions using cross-region replication
* [Storage Gateway](https://jayendrapatil.com/aws-storage-gateway/) – Regional
  + AWS Storage Gateway stores volume, snapshot, and tape data in the AWS region in which the gateway is activated
* [AWS GuardDuty](https://jayendrapatil.com/amazon-guardduty/) – Regional
  + findings remain in the same Regions where the underlying data was generated.
* [Amazon Detective](https://jayendrapatil.com/amazon-detective/) – Regional
* [Amazon Inspector](https://jayendrapatil.com/amazon-inspector/) – Regional
* [Amazon Macie](https://jayendrapatil.com/aws-macie/) – Regional
  + must be enabled on a region-by-region basis and helps view findings across all the accounts within each Region.
  + verifies that all data analyzed is regionally based and doesn’t cross AWS regional boundaries.
* [AWS Security Hub](https://jayendrapatil.com/aws-security-hub/) – Regional.
  + supports cross-region aggregation of findings via the designation of an aggregator region.
* [AWS Migration Hub](https://jayendrapatil.com/aws-migration-hub/) – Regional.
  + runs in a single home region, however, can collect data from all regions

## **AWS Management & Governance Tools**

* [AWS Config](https://jayendrapatil.com/aws-config/) – Regional
* [AWS Service Catalog](https://jayendrapatil.com/aws-service-catalog/) – Regional

## **AWS** Availability Zone **SERVICES :-**

## **AWS Networking Services**

* Subnet – **Availability Zone**
  + A subnet can span only a single Availability Zone
* Elastic Network Interface – Availability Zone
* Instances – **Availability Zone**
  + An instance is tied to the Availability Zones in which you launched it. However, note that its instance ID is tied to the region.
* EBS Volumes – **Availability Zone**
  + Amazon EBS volume is tied to its Availability Zone and can be attached only to instances in the same Availability Zone.
* [Cluster Placement Groups](https://jayendrapatil.com/aws-ec2-placement-groups/#Cluster_Placement_Groups) – **Availability Zone**
  + Cluster Placement groups can span across Instances within the same Availability Zones