Simple Storage Service (S3)

What is S3 :

- As its named it does the same. It allows you to store objects like images, data, backup, video, audio, etc. in a folder structure.
- It's a cost effective storage solution charges $0.023 per/GB for storage
- Provides cheap, reliable, low latency and high throughput access
- You can host a static website in an easy way
- It is well integrated with CloudWatch, SNS, SQS and Lambda which enable you to build an event driven application
- A bucket name is unique globally
- S3 Limitations
    - Number of objects in a bucket : unlimited
    - Maximum size of an object can be 5TB
    - Maximum size of an object with 160GB can be uploaded using S3 console
    - Object size larger than 5Gb and up to 5TB can be uploaded using multipart upload APIs with SDK, REST API and CLI
    - Multipart size can vary from 5MB to 5GB and maximum number of parts can be 10,000
    - With versioning enabled bucket if you upload an object with the same name then it will create another version instead of replacing the existing object

S3 Storage Classes :

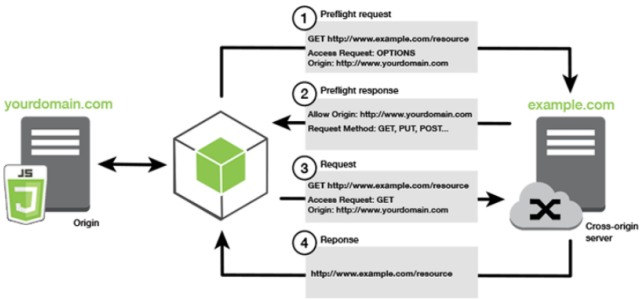
- Standard
    - Default storage type
    - Expensive than others
    - No retrieval charge
    - Min storage duration : NA
    - Use case is for accessing on daily basis
    - No retrieval charge or almost less
    - Data stored in 3 different zones
    - Provides high availability, durability and performance for frequently accessed data
    - Durability is 99.999999999
    - Availability is 99.99
    - Data encryption at-rest and in-transit (SSL)
- Standard IA (Infrequent Access)
    - If you use the data 2-3 times on a month
    - Retrieval charge is applied
    - Min storage duration : 30
    - Data stored in 3 different zones
    - Designed for storing infrequent access data, but can be accessed faster when needed
    - Storage cost is almost half of the standard tier
    - Durability is 99.999999999
    - Availability is 99.9

    - Data encryption at-rest and in-transit (SSL)
    - Data deleted within 30 days will be charged for entire 30 days
- One-Zone IA (Infrequent Access)
    - Data stored only in one zone
    - Cost is cheaper than standard IA
    - Min storage duration : 30
    - Designed for storing data that are accessed less frequently but can be accessed faster when needed
    - Can be used to store secondary backup copies of on-premises data
    - Durability is 99.999999999
    - Availability is 99.5
    - Important to remember that as its store data only in one zone if data lost cant be recovered
- Intelligent Tiering
    - Data stored in 3 different zones
    - No retrieval charge
    - Monitoring and auto-tiering fees is applied per-object fees
    - Min storage duration : 30
    - Designed for optimizing cost by moving data automatically to the most cost effective access tier
    - Durability is 99.999999999
    - Availability is 99.9
    - Provides similar performance as standard tier
    - It stores data in two access tiers
    - If any data is on IA and that data is accessed once then it moves back to the standard automatically
    - Object less than 128 KB cannot be moved to IA
    - It has no retrieval charge and no additional charges when data is moved between access tiers
- Reduced Redundancy Storage (Old)
    - Designed to store noncritical, reproducible data at lower levels of redundancy than Amazon S3's standard storage
    - It does not replicate objects as many times as standard Amazon S3 storage.
    - Durability is 99.99
    - Availability is 99.99
- Glacier
    - Use case is storing data for longer period
    - Retrieval charge
    - No cost for putting data
    - Min storage duration : 90
    - Data stored in 3 different zones
    - Designed for secure, durable and cost effective archival storage
    - It has three retrieval options starting from 1 minutes to hours
    - Data can be uploaded directly to Glacier or by using storage life cycle policies

    - Durability is 99.999999999
    - Availability is 99.9
    - Data encryption at-rest and in-transit (SSL)
- Glacier Deep Archive
    - Most cheapest among all
    - Use case is storing data for longest period
    - Retrieval charge
    - Min storage duration : 180
    - No cost for putting data
    - Data stored in 3 different zones
    - Durability is 99.999999999
    - Availability is 99.9
    - Use case can be to store magnetic tape backups
    - Retrieval time is within 12 hours
    - Storage cost is up to 75% lesser than glacier storage tier
- 4-steps to follow
    - Create bucket
    - Configure options
    - Permissions
    - Upload file
- Object level logging
    - To prevent deleting and overwriting of the objects to meet compliance
- CORS (Cross Origin Resource Sharing)
    - CORS, is a security feature of modern web browsers.
    - Useful when you are hosting a website
    - CORS configuration is an XML file, which contains series of CORSRules and it can have up to 100 rules
    - Sample CORS configuration file (https://docs.aws.amazon.com/sdk-for-javascript/v2/developer-guide/cors.html)

```
<!-- Sample policy -->
<CORSConfiguration>
    <CORSRule>
        <AllowedOrigin>*</AllowedOrigin>
        <AllowedMethod>GET</AllowedMethod>
        <MaxAgeSeconds>3000</MaxAgeSeconds>
        <AllowedHeader>Authorization</AllowedHeader>
    </CORSRule>
</CORSConfiguration>
```

    - Cross domain access



- S3 Delete Marker
    - It is marker (key name/ version ID) for a versioned object that is named in a simple DELETE request. When you enable versioning on a bucket the object is not deleted but because of this marker S3 behaves as if it is deleted.
    - It does not have data associated with it
    - It is not associated with an ACL
- S3 Replication
- S3 Life Cycle
- Static Website Hosting
    -

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "s3:GetObject",
            "s3:ListBucket",
                                 "s3:List*",
                                 "s3:PutBucket"

         ],
         "Resource": [
            "arn:aws:s3:::batch2021-bucket/*",
            "arn:aws:s3:::batch2021-bucket"
```

```
            ]
        }
    ]
}
```

Important Links :

- https://aws.amazon.com/s3/features/access-points/#:~:text=Amazon%20S3%20Access%20Points%2C%20a,made%20through%20the%20access%20point.
- https://docs.aws.amazon.com/AmazonS3/latest/userguide/example-bucket-policies.html#example-bucket-policies-use-case-2
- https://aws.amazon.com/blogs/aws/introducing-amazon-s3-object-lambda-use-your-code-to-process-data-as-it-is-being-retrieved-from-s3/
- https://aws.amazon.com/s3/features/batch-operations/#:~:text=S3%20Batch%20Operations%20is%20a,data%20with%20a%20single%20request.
- https://docs.aws.amazon.com/AmazonS3/latest/userguide/EnableWebsiteHosting.html

AWS CLI Reference Link :

- https://docs.aws.amazon.com/cli/latest/userguide/cli-configure-profiles.html
- https://docs.aws.amazon.com/cli/latest/userguide/cli-services-ec2-instances.html
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