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Simple Storage Service (S3)
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-> S3 is object based storage

-> In s3 we can store all flat files

-> We can upload , download and access files from S3

-> The files in s3 can't be executed

-> We can't install OS, DB etc in S3

-> We can attach S3 to ec2 instance but we can access s3 from EC2 instance

-> S3 is unlimited storage

-> S3 supports static website hosting

-> S3 is cheaper than EC2

-> S3 is serverless

-> In S3 we will store data in buckets. Bucket is a container. bucket contains object

object = file
key is name of the object

-> S3 is global but buckets are regional

-> Bucket names are universal or unique

Note: always create a bucket with your company name or project name.

-> We can't create one bucket inside another bucket

-> We can creat bultiple buckets in multiple regions

-> Max no.of buckets you can create in S3 is 100 (soft limit)

-> By default buckets are private, if required we can make it public.

create bucket -> inside that folder called photos -> inside that upload puppy.jpg

Note: Every object will have its own url/endpoint.

Ex: http://8pmbukcet.s3.amazonaws.com/photos/puppy.jpg

bucketname+ domain + object name

-> S3 uses WORM model (Write Once and Read Many)

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Versioning
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-> Versioning is like a backup tool

-> By default versioning is not enabled on the bucket

-> Versioning is enabled on bucket level but applied on object level.

-> when we upload same file multiple times then versions will be created.

corejava.jpg (v1, v2, v3) - v3 latest version

advjava.jpg (v1, v2, v3) - v3 is latest version

-> If somebody deleted my original object by mistake, for latest version delete marker label will be applied.

-> Version ID is always unqiue

-> versioning files we can download at any time

-> If you delete the original object, delete marker is applid on the latest versioning

-> If you want the object to be re-stored, delete the delete marker and your object is re-stored.

-> You can't download delete marker version, you can only delete it.

-> Once you have enabled the versioning, you can't disable it. You can only suspend it.

-> AWS charges for Versioning, becareful while you enable versioning for huge files.

-> S3 is unlimited storage

min obj size = 0 Bytes
Max obj size = 5 TB

We can have unlimited no.of 5TB objs in a single bucket

For single PUT, we can upload max 5 GB.

-> If we want to upload bigger file then we shud go for Multi_part upload (MPU) (break files in smaller chunks and upload it)

-> AWS recommended, if you have >100 MB use MPU

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Storage Classes
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-> While uploading the objects into S3 , selecting storage class is mandatory

Scenario : some customers wants to store and wants to access data frequently... some other customers wants to store data but don't want to access frequently... we can't charge same bill for both customers because they have diff businss requirements.

-> To meet business requirements of clients, AWS provided several storage classes in S3

Standard Frequently Access( FA )
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This is used for frequently access data

Default storage class
Regular purpose (storing, website, images etc)
No retrival charges
Availability = 99.9 %
Durability=999999999 (11 9's)
Min Obj size is 0 Bytes

Standard In-Frequently Access (IA)
---
Frequently access but not critical
Not Retrival charges

```
AWS doesn't recommend to use this
Cheaper than others
Availability = 99.9 %
Durability=99.99%
min obj size = 128 kb
min duration : 30 days

One Zone IA
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In-frequently access but not critical

retrival charges apply
availability=99.99%
Durability= 11 9's
Min Obj size = 128 KB
min obj size = 128 kb
min duration : 30 days



Intelligent Tiering
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Unknown access pattern
Based on access it moves from FA to IA
availability=99.99%
Durability= 11 9's

min duration : 30 days

Glacier
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Infrequently access data
archiving purpose
vault : container of archives
Archive : Object /Archive(zip) -> 40 TB
unlimited no.of archives
1000 vaults
Retrival charges apply


Glacier has retrival options
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Expedited : 1 to 5 mins
Standard : 3 to 5 hours
Bulk : 5 to 12 hours
availability=99.99%
Durability= 11 9's
Min duration : 90 days

Note: Deep Glocier min duration is 180 days

-> It is possible to move the objects from one storage class to another storage class automatically
(LCM) -> Life Cycle management.


-> LCM is created on bucket level and applied on object level

-> Life cycle rule  (current version & previous version)

-> my obj moving from FA -> IA (30 days) -> Glacier(60 days) ->this is called transition

-> Delete after 365 days (Expiration)

-> Object Lock (Permanent Lock & certain period lock)
```

-> I have a bucket named as movies.

-> We can enable bucket logs to identify who is accessing our bucket

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Encryption
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Encryption is used for security

Encryption can be done in 2 ways

In-Transit : Encryption while data is moving/flow HTTPS

Data At Rest : Encryption while data is at rest

-> Amazon S3 has 3 types of encryptions

serer-side encryption
SSE - S3 (AWS Managed Key)
SSE - KMS (AWS KMS Key)
SSE - C (Customer Provided Key)

client-side encryption (should be handled by customer, how to reach aws is our headache )
in-transit encryption (using https)

-> AWS Certification manager (ACM)
is where you can generate HTTPS certificates (SSL/TLS/HTTPS)

-> S3 data consistency models - 2 types

Read after write consistency for PUTS of new objects (immediatley)
Eventually consistency for overwrites of puts and deletes

-> Pre-Signed URL (it will be accessible for limited time)

Transfer Acceleration
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-> If we want to transfer the data from our place to AWS bucket it will use our own internet.

-> We can speed up transfer process using Transfer Acceleration.

-> It is used to transfer data fastly (It will use CDN concept)

-> With CDN it will use AWS internal network

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Static Website Hosting using S3
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1) Create a bucket in S3 (bucket-name : ashokit.org)

- Enter unique name for bucket

- uncheck block public access

2) Goto bucket permissions tab -> configure below policy for bucket

```
{
    "Version": "2012-10-17",
    "Statement": [
```

```
        {
            "Sid": "PublicReadGetObject",
            "Effect": "Allow",
            "Principal": "*",
            "Action": [
                "s3:GetObject"
            ],
            "Resource": [
                "arn:aws:s3:::ashokit.org/*"
            ]
        }
    ]
}
```

2) Upload Website content files in bucket (assets folder, index.html and error.html)

3) Go to Bucket Properties tab -> Enable Static Website hosting and configure index and error pages

index.html for main content
error.html for wrong url

4) It will display URL, access that URL