Passerelles numériques

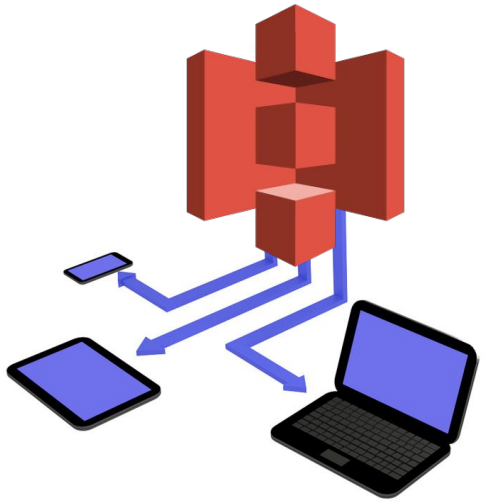
*A Gateway for Life*

# Simple Storage Service (S3)

***AWS AMAZON***

# OBJECTIVe

1. Use case storage capacity
2. Introduction of S3
3. S3 terminology
4. S3 storage classes
5. Create the simple bucket
6. Bucket Navigation
7. Hosting static website



# Use Case -Storage Capacity

Ex. One enterprise selling online need to retain their logs for 1 year about payment record of customer. It has been found that everyday, the payments server generate logs of 200 GB. How  to achieve this use case pertaining to the storage capacity in a cost effective manner?

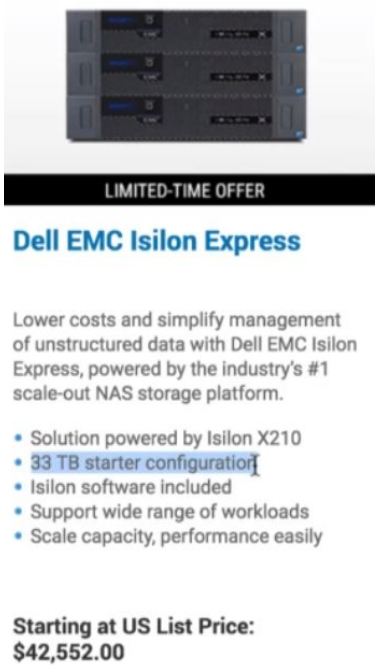
## Older Approach

- Buy huge storage devices ( 200GB x 365 day = 73000GB or 73 TB)
- Ensure High Availability ( Need at least two to make sure it not down)
- Hire Storage Administrators
- Ensure security for storage servers.

## Newer Approach

- Create a AWS account
- Upload all log files to AWS S3

Check Link: https://aws.amazon.com/s3/pricing/



# Introduction of S3

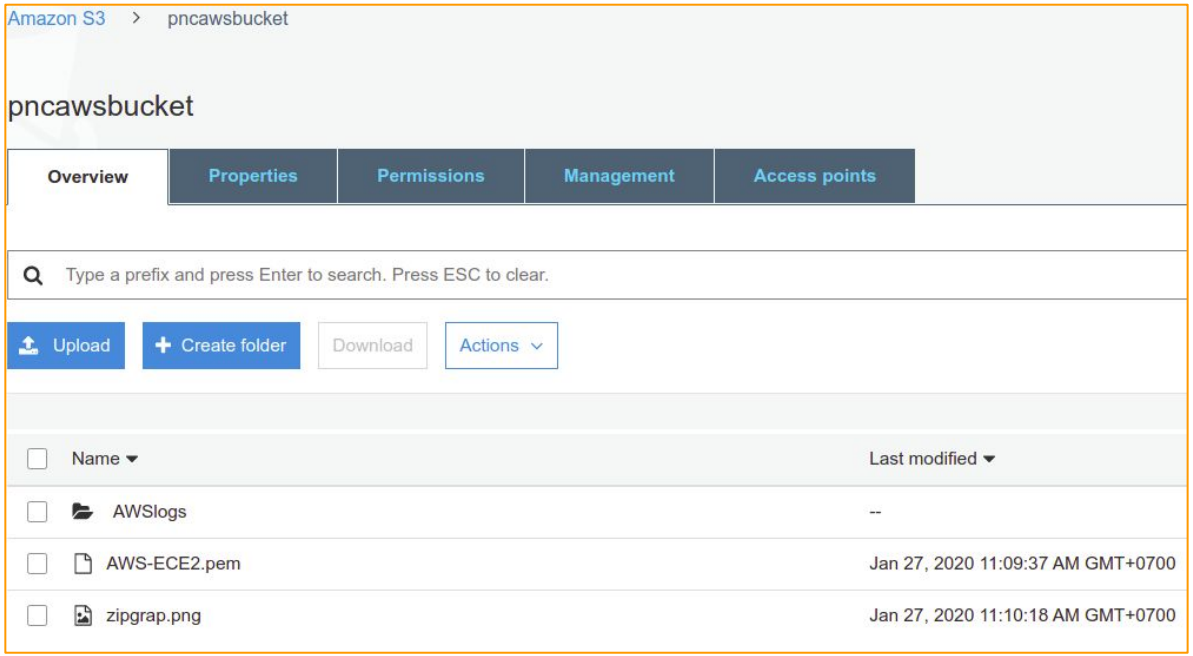
- AWS S3 is an object storage designed to store and retrieve any amount of data with scalability, data availability, security, and performance from anywhere.
- It is designed for 99.999999999% (11 9s) durability and 99.99% availability.
- The thing that makes AWS S3 so powerful are the features that it come preloaded with which are simply the best.

| S3 Features | | |
|---|---|---|
| Versioning | Encryption | Logging |
| Transfer Acceleration | Cross Region Replication | Events |
| Requester Pays | Static Website Hosting | Tagging |

# S3 Terminology

There are two important terminology in AWS S3:

- Buckets: refer to ***folders***
- Objects: refer to ***files***




# S3 storage classes

There are 6 S3 storage classes use in different purpose:

- *S3* ***standard*** : General purpose storage for any type of data, typically used for frequently accessed data
- *S3* ***Intelligent***-Tiering: Automatic cost savings for data with unknown or changing access patterns
- *S3* ***Standard-IA*** : For long lived but infrequently accessed data that needs millisecond access
- *S3* ***One Zone-IA*** : For re-createable infrequently accessed data that needs millisecond access
- *S3* ***Glacier***: For long-term backups and archives with retrieval option from 1 minute to 12 hours
- *S3* ***Glacier Deep Archive***: For long-term data archiving that is accessed once or twice in a year and can be restored within 12 hours

IA= Infrequent Access

# S3 storage classes

S3 Standard (general purpose)  offers high durability, availability, and performance object storage for frequently accessed data. Because it delivers low latency and high throughput, S3 Standard is appropriate for a wide variety of use cases.

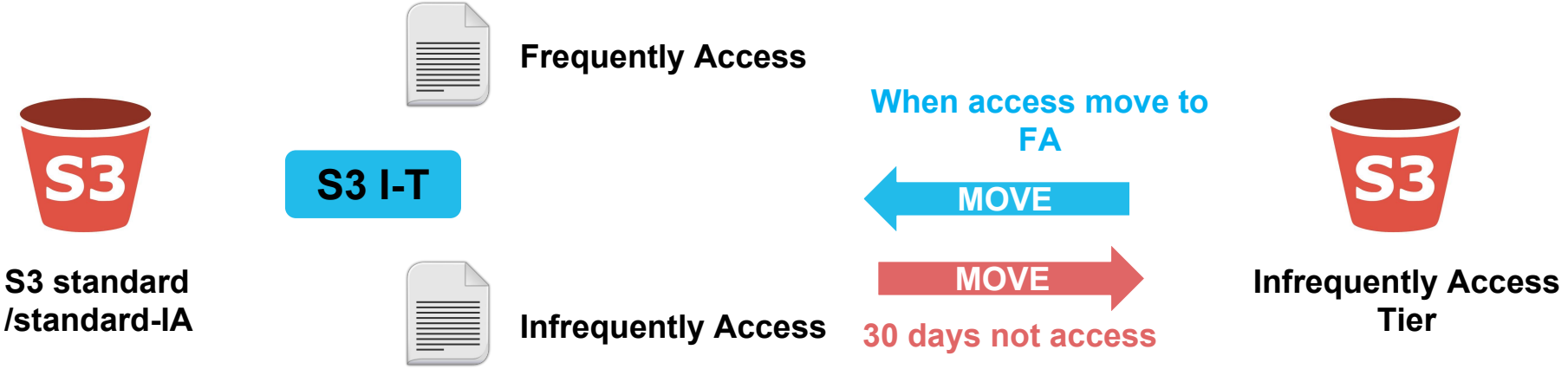



S3 Standard - General purpose storage for any type of data, typically used for frequently accessed data

- First 50 TB / Month  $0.023 per GB
- Next 450 TB / Month  $0.022 per GB
- Over 500 TB / Month  $0.021 per GB

# S3 storage classes

The ***S3 Intelligent-Tiering*** storage class is designed to optimize costs by automatically moving data to the most cost-effective access tier, without performance impact or operational overhead. It is the ideal storage class for long-lived data with access patterns that are ***unknown*** or ***unpredictable***.



# S3 storage classes

The S3 Intelligent-Tiering storage class :

- For monthly monitoring and automation fee per object.
- No fee when move data between S3 access tier

The S3 Intelligent-Tiering storage pricing:

- Frequent Access Tier, First 50 TB / Month $0.023 per GB
- Frequent Access Tier, Next 450 TB / Month $0.022 per GB
- Frequent Access Tier, Over 500 TB / Month $0.021 per GB
- Infrequent Access Tier, All Storage / Month $0.0125 per GB

# S3 storage classes

The ***S3 Standard-IA*** is for data that is accessed less frequently, but requires rapid access when needed. S3 Standard-IA offers the high durability high throughput, and low latency of S3 standard, which ideal for long-term storage, backups, and as a data store for disaster recovery files.

***S3 Standard - Infrequent Access*** * - For long lived but infrequently accessed data that needs ***millisecond*** access

- All Storage / Month $0.0125 per GB

# S3 storage classes

***S3 One Zone-IA*** is for data that is accessed less frequently, but requires rapid access when needed. Unlike other S3 Storage Classes which store data in a minimum of three Availability Zones (AZs), S3 One Zone-IA stores data in a single AZ and costs 20% less than S3 Standard-IA. S3 One Zone-IA is ideal for customers who want a lower-cost option for infrequently accessed data. Data will be lost in-cast of availability zone destruction.

***S3 One Zone - Infrequent Access*** * - For re-createable infrequently accessed data that needs millisecond access

- All Storage / Month $0.01 per GB

# S3 storage classes

***S3 Glacier*** is a secure, durable, and low-cost storage class for data archiving. You can reliably store any amount of data at costs that are competitive with or cheaper than on-premises solutions. Ideal for long-term backups and archives with retrieval option from 1 minute to 12 hours

***S3 Glacier*** ** - For long-term backups and archives with retrieval option from 1 minute to 12 hours

- All Storage / Month $0.004 per GB

# S3 storage classes

***S3 Glacier Deep Archive*** is Amazon S3's lowest-cost storage class and supports long-term retention and digital preservation for data that may be accessed once or twice in a year. It is designed for customers — particularly those in highly-regulated industries, such as the Financial Services, Healthcare, and Public Sectors — that retain data sets for 7-10 years. S3 Glacier Deep Archive are replicated and stored across at least three Availability Zones, protected by 99.999999999% of durability, and can be restored within 12 hours.

***S3 Glacier Deep Archive***

- All Storage / Month $0.00099 per GB

# S3 storage classes

| | S3 Standard | S3 Intelligent-Tiering | S3 Standard-IA | S3 One Zone-IA† | S3 Glacier | S3 Glacier Deep Archive |
|---|---|---|---|---|---|---|
| Designed for durability | 99.999999999% (11 9's) | 99.999999999% (11 9's) | 99.999999999% (11 9's) | 99.999999999% (11 9's) | 99.999999999% (11 9's) | 99.999999999% (11 9's) |
| Designed for availability | 99.99% | 99.9% | 99.9% | 99.5% | 99.99% | 99.99% |
| Availability SLA | 99.9% | 99% | 99% | 99% | 99.9% | 99.9% |
| Availability Zones | ≥3 | ≥3 | ≥3 | 1 | ≥3 | ≥3 |
| Minimum capacity charge per object | N/A | N/A | 128KB | 128KB | 40KB | 40KB |
| Minimum storage duration charge | N/A | 30 days | 30 days | 30 days | 90 days | 180 days |
| Retrieval fee | N/A | N/A | per GB retrieved | per GB retrieved | per GB retrieved | per GB retrieved |
| First byte latency | milliseconds | milliseconds | milliseconds | milliseconds | select minutes or hours | select hours |

# Create the simple bucket

***Go to S3***

=> Click create bucket  ( default 1 account=100 buckets, and request up to 1000 buckets)

=> Bucket name:

- The name must be unique across all existing bucket names in Amazon S3
- The name must not contain uppercase characters.
- The name must start with a lowercase letter or number.
- The name must be between 3 and 63 characters long.
- After you create the bucket, you cannot change the name, so choose wisely.

=> Can chose regions to store your bucket

=> Can choose storage class and other options.

# Demo + Practice

***Create your first bucket:***

1. *Create bucket with any name*
2. *Upload some files and folder to your bucket*

# Bucket Navigation

| Overview | Properties | Permissions | Management | Access points |
|---|---|---|---|---|

In here you can:

- Upload / Download objects
- Create folders or remove objects
- Viewer all objects, folders

# Bucket Navigation

| Overview | Properties | Permissions | Management | Access points |
|---|---|---|---|---|

There are a lot of options in there but we choose only main options:

Basic setting:

- Versioning: enable to keep track on version of the object ( previous, current) in same bucket.
- Static website hosting: host a static website, which does not require server-side technologies.
- Encryption:enable to encrypt the objects in the bucket.
- Server access logging: set up access log records that provide details about access requests.

Advanced setting:

- Object lock: Prevent objects from being deleted.
- Tags: tags your S3 to track cost.
- Transfer acceleration: Enable fast, easy and secure transfers of files to and from your bucket.
- Events: Receive notifications when specific events occur in your bucket.
- Requester pays: The requester (instead of the bucket owner) will pay for requests and data transfer.

# Bucket Navigation

| Overview | Properties | Permissions | Management | Access points |
|---|---|---|---|---|

There are 4 options

- Block public access: Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all.
- Access Control List: use to grant basic permission read/write to AWS account for accessing the bucket.
- Bucket Policy: advance permission for access to your S3 resources.
- CORS configuration:  N/A

# Bucket Navigation

Using ***AWS Policy Generator*** to generate the policy. There are 3 steps:

- **Step 1**: Select Policy Type ( S3 Bucket Policy)
- **Step 2**: Add Statement(s): can add many statements (rules) for generate
  - Action: authorization, what can do
  - Principal: refer to account, user, group
  - Effect: Allow | Deny
  - Amazon Resource Name (ARN): name of bucket ( arn:aws:s3:::examplebucket/*)
- **Step 3**: Generate Policy: Click generate policy to get the syntax

# Bucket Navigation

| Overview | Properties | Permissions | Management | Access points |
|---|---|---|---|---|

There are 5 options for management:

- Lifecycle: create policy for automate transition the objects between storage class.
- Replication: crate rule for replicate your bucket between Region or same region.
- Analytics: analyze storage access patterns to help you decide when to transition the right data to the right storage class.
- Metrics: using CloudWatch to view report about bucket action.
    - Storage metrics (free)
    - Request metrics (paid)
    - Data transfer metrics (paid)
- Inventory: N/A

# Bucket Navigation

**Lifecycle:** policy for automate transition the objects between storage class in duration of time. Ex. Your company want to keep customer record ( customer's card data) at least 5 years. And you want to move all records automatically.

- We can store 3 months of logs record in S3 standard.
- Move the logs older than 3 months to S3 Standard IA
- Move the logs older than 1 year to Glacier

# Hosting static website

**Step 1: Create a Bucket in S3**

Name of bucket have to be same as your website " www.pnclabs2020.com" and keep default for unnecessary options.

----------**Modify bucket** ----------

**Step 2: Upload your website (files) -** Upload your website and make sure file "xxx.html" is outside

**Step 3: Enable your bucket to be static website** ( S3>bucketname>Properties>Static website hosting)

**Step 4: Set permission for access public**

1. Untick *Block all public access (* S3>bucketname>Permission> Block public access)
2. There are 3 ways to filter access by public, chose one of following:
    a. Select your all files => Action => Make public (read only)
    b. Go to S3>bucketname>Permission> Access control list > Public access (everyone) > chose list objects
    c. Go to S3>bucketname>Permission>Bucket Policy > Put your policy there
        - Principle "*"
        - Action " GetObject"
        - Resource": arn:aws:s3:::<bucket_name>/<key_name>"
        - Effect: Allow


# Questions

www.passerellesnumeriques.org