# 1.5 S3 Storage Classes

## Amazon S3 Bucket Overview

- Cloud Storage
- Amount of Data
- Data Access Frequency
- Redundancy
- Cost

## S3 Storage Classes

| S3 object class | Description |
|---|---|
| Standard | Data accessed frequently |
| One-zone IA | Data accessed infrequently |
| Glacier | Low-cost data archiving, retrieval can take minutes to hours |
| Intelligent tiering | Data is automatically placed in the best storage tier |

Set the S3 bucket folder or object levels

# Amazon S3 Glacier

- Cloud archiving
- Retrieval of archived data in minutes
- Inexpensive storage for infrequently accessed data
- Policies can be configured for regulatory compliance
  - Immutable (archives cannot be altered)

When something is immutable, it means that it cannot be modified.

# Amazon S3 Glacier

- S3 Lifecycle management
  - Automatically move inactive data to Glacier
- Glacier requires a vault for archive storage
  - Vaults can be created using the AWS Management Console
- AWS CLI, REST API, AWS SDKs
  - Required when uploading and retrieving archive data

## AWS CLI Glacier Management

```
aws glacier upload-archive --account-id 111279832722 --
vault-name Vault1 --body File.txt


aws s3 cp s3://bucket448888/LicenseKey.txt
s3://bucket448888/LicenseKey.txt --storage-class GLACIER
```

## AWS PowerShell Glacier Storage Class

```
Copy-S3Object -BucketName bucket448888 -Key /Project_A.txt -
DestinationKey /Project_A.txt -StorageClass GLACIER
```

Amazon S3 Glacier Deep Archive

1. Long – term archiving
2. Access once or twice annually
3. Retrieval within 12 hours
4. Offline data protection


**Managing S3 Buckets Using the GUI**

**Managing S3 Buckets Using the AWS CLI**

```
C:\>aws s3api create-bucket --bucket bucket446388 --region us-east-1
{
    "Location": "/bucket446388"
}


C:\>_
```

```
C:\>aws s3api list-buckets --query "Buckets[].Name"
[
    "appstream-app-settings-us-east-1-611279832722-voql7dpi",
    "appstream2-36fb080bb8-us-east-1-611279832722",
    "bucket446388",
    "bucketyhz172",
    "bucketyyy",
    "bucketyyz",
    "elasticbeanstalk-us-east-1-611279832722",
    "testbucketyhz"
]


C:\>_
```

All the commands are case sensitive

## Managing S3 Buckets Using PowerShell

```
PS C:\> New-S3Bucket -BucketName bucket669920 -Region us-east-1

CreationDate          BucketName
------------          ----------
8/03/20 12:04:05 PM bucket669920


PS C:\>
```

```
Administrator: Windows PowerShell                                              —  □  ×
PS C:\> Get-S3Bucket

CreationDate        BucketName
------------        ----------
2/11/20 10:32:27 AM appstream-app-settings-us-east-1-611279832722-voql7dpi
2/11/20 10:32:27 AM appstream2-36fb080bb8-us-east-1-611279832722
8/03/20 8:59:10 AM  bucket446388
8/03/20 9:04:07 AM  bucket669920
7/31/20 12:27:59 PM bucketyhz172
1/09/20 2:49:26 PM  bucketyyy
1/09/20 2:26:25 PM  bucketyyz
9/19/17 12:31:37 PM elasticbeanstalk-us-east-1-611279832722
3/09/20 1:20:55 PM  testbucketyhz


PS C:\> _
```

```
Administrator: Windows PowerShell                                              —  □  ×
PS C:\> Remove-S3Bucket -BucketName bucket669920

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-S3Bucket (DeleteBucket)" on target "bucket669920".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): y

ResponseMetadata               ContentLength HttpStatusCode
----------------               ------------- --------------
Amazon.Runtime.ResponseMetadata 0            NoContent


PS C:\> Get-S3Bucket

CreationDate        BucketName
------------        ----------
2/11/20 10:32:27 AM appstream-app-settings-us-east-1-611279832722-voql7dpi
2/11/20 10:32:27 AM appstream2-36fb080bb8-us-east-1-611279832722
8/03/20 8:59:10 AM  bucket446388
7/31/20 12:27:59 PM bucketyhz172
1/09/20 2:49:26 PM  bucketyyy
1/09/20 2:26:25 PM  bucketyyz
9/19/17 12:31:37 PM elasticbeanstalk-us-east-1-611279832722
```

**Uploading the S3 Object Using the CLI**

```
Command Prompt                                                                 —  □  ×
D:\SampleFiles>dir *.txt
 Volume in drive D is DATA
 Volume Serial Number is 3821-269E

 Directory of D:\SampleFiles

12/26/14  09:02 AM                29 LicenseKey.txt
12/03/19  11:26 AM               467 Project_A.txt
               2 File(s)            496 bytes
               0 Dir(s)  643,410,595,840 bytes free

D:\SampleFiles>
```

We are only looking for text files so .txt

```
Command Prompt                                                      —  □  ×

D:\SampleFiles\Projects>dir *.txt
 Volume in drive D is DATA
 Volume Serial Number is 3821-269E

 Directory of D:\SampleFiles\Projects

12/03/19  10:16 AM                 468 Project_A.txt
11/08/16  01:32 PM                 912 Project_B.txt
11/08/16  01:32 PM              26,112 Project_C.txt
               3 File(s)          27,492 bytes
               0 Dir(s)  643,407,712,256 bytes free

D:\SampleFiles\Projects>
```

In project directory and have text files



```
Command Prompt                                                      —  □  ×

D:\SampleFiles\Projects>aws s3 cp d:\samplefiles s3://bucket446388/ --recursive --exclude "*" --i
nclude "*.txt"
upload: ..\LicenseKey.txt to s3://bucket446388/LicenseKey.txt
upload: ..\Project_A.txt to s3://bucket446388/Project_A.txt
upload: .\Project_A.txt to s3://bucket446388/Projects/Project_A.txt
upload: .\Project_B.txt to s3://bucket446388/Projects/Project_B.txt
upload: .\Project_C.txt to s3://bucket446388/Projects/Project_C.txt

D:\SampleFiles\Projects>
```

Cp = copy the having the file path , file name

--recursive = incluse sub directries if having

Then exclude * i.e. everything and inlcude "*.txt" i.e. only text files

```
D:\SampleFiles\Projects>aws s3 ls s3://bucket446388
                           PRE Projects/
2020-08-03 09:22:21         29 LicenseKey.txt
2020-08-03 09:22:21        467 Project_A.txt

D:\SampleFiles\Projects>aws s3 ls s3://bucket446388/projects

D:\SampleFiles\Projects>aws s3 ls s3://bucket446388/Projects
                           PRE Projects/

D:\SampleFiles\Projects>aws s3 ls s3://bucket446388/Projects --recursive
2020-08-03 09:22:21        468 Projects/Project_A.txt
2020-08-03 09:22:21        912 Projects/Project_B.txt
2020-08-03 09:22:21      26112 Projects/Project_C.txt

D:\SampleFiles\Projects>
```

## Uploading the S3 Object Using PowerShell



```
PS D:\SampleFiles> Write-S3Object -BucketName bucket446388 -Folder d:\samplefiles\ -Recurse -KeyPrefix "HQ"

Uploading
    Uploaded 1 of 17 files from d:\samplefiles\, processing: ustomerDatabase.accdb
    [oooooooooooooooooooooooooooooooooooooooooooooooooooo                                    ]
```



```
PS D:\SampleFiles> Get-S3Object -BucketName bucket446388 | select key

Key
---
HQ/CardData.db
HQ/CustomerDatabase.accdb
HQ/CustomerTransactions.xlsx
HQ/HR_EmployeeList.xlsx
HQ/LicenseKey.txt
HQ/Project_A.txt
HQ/Projects/ProjectA_Budget.xls
HQ/Projects/ProjectB_Budget.xls
HQ/Projects/ProjectC_Budget.xls
HQ/Projects/ProjectD_Budget.xls
HQ/Projects/Project_A.txt
HQ/Projects/Project_B.txt
HQ/Projects/Project_C.txt
HQ/Regional_Spending_2016.csv
```

## Configuring S3 Bucket LifeCycle Policies

Management Tab -> lifecycle -> create lifecycle

Rule name and fill all the other details -> add transition

## Enabling S3 Bucket versoning

Bucket -> properties -> versioning  -> enable it

Used to retain multiple versions of the same file

## Identifying S3 Bucket Stroage Tiers

## S3 Bucket Transfer Acceleration

Bucket -> properties -> advance settings -> transfer acceleration -> enable it -> save it

## Configuring Amazon S3 Glacier



## Using S3 Bucket Public Access

Default is public access disabled
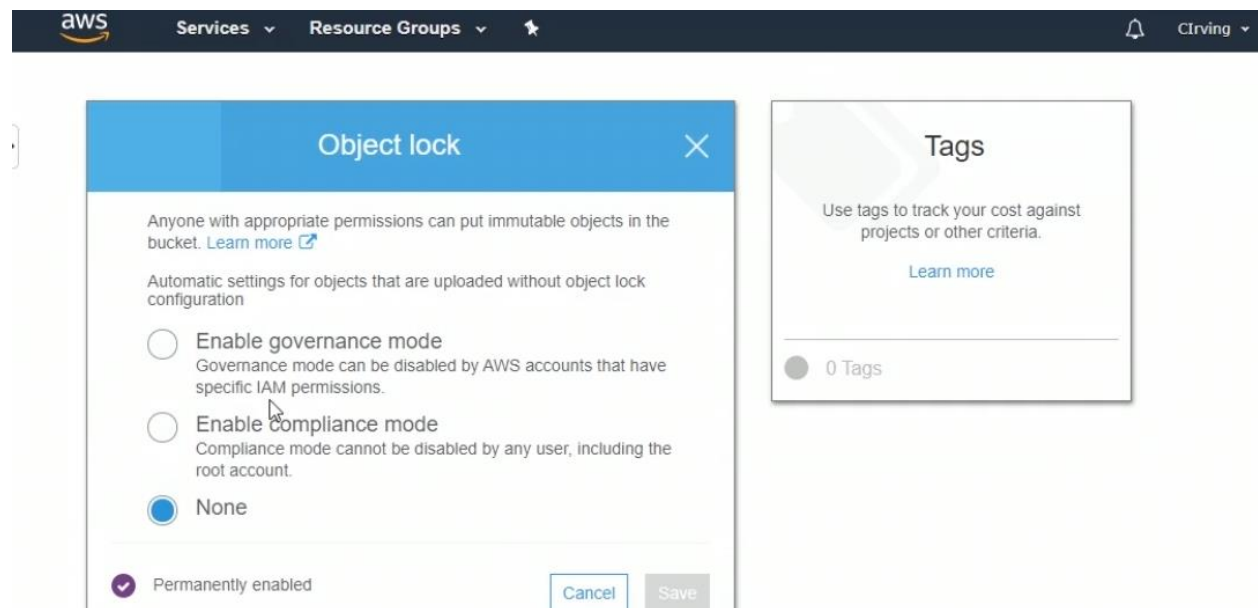
For making it public, click on make public button in overview tab for the individual object you want to make public

**Using S3 Bucket Locking**

Bucket -> properties -> advance settings -> object lock

We have to create a bucket first



**S3 Storage Gateway**

AWS Storage Gateway

5.  Hybrid storage
6.  Cloud backup solution
7.  Cloud tape emulator
8.  Cloud- backed on -prem fileshares

AWS Storage Gateway
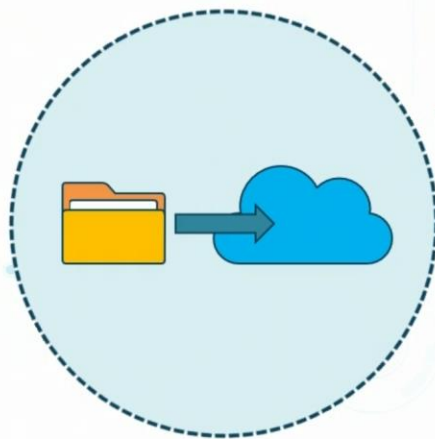
- Tape gateway (iSCSI)
- File gateway (NFS, SMB)
- Volume gateway (iSCSI -> EBS)

talk to the file gateway, the storage gateway,



AWS Storage Gateway

Client access via
NSF, SMB, iSCSI

On-premises data sources

AWS Storage Gateway

Cloud data sources:

- S3
- S3 Glacier
- EBS
- AWS Backup

**Creating the EBS Volumes Using the GUI**

EBS = Elastic Block Store

Standalone AWS resource

Volumes | EC2 Management Con ×    +

console.aws.amazon.com/ec2/v2/home?region=us-east-1#Volumes:sort=desc:createTime    ☆    🕵 Incognito

aws    Services ▾    Resource Groups ▾    📌                    🔔    CIrving ▾    N. Virginia ▾    Support ▾

Spot Requests          Create Volume    Actions ▾                              ⚗    🔄    ⚙    ❓
Savings Plans
Reserved Instances    🔍 Filter by tags and attributes or search by keyword                      ❓    |< <    1 to 3 of 3    > >|
Dedicated Hosts  New
Scheduled Instances        ☐   Name ▾   Volume ID ▾   Size ▾   Volume Type ▾   IOPS ▾   Snapshot ▾   Created ▾   Availability Zone ▾   State
Capacity Reservations      ☐         vol-0a3eadc...   30 GiB   gp2      100   snap-0f4ea0f5...   July 8, 2020 at 11:5...   us-east-1a   🟢 in
                           ☐         vol-0aa50f5e...  30 GiB   gp2      100   snap-02b0435...   July 8, 2020 at 11:2...   us-east-1a   🟢 in
▼ Images                   ☐         vol-0546245...   30 GiB   gp2      100   snap-0c80091...   July 8, 2020 at 8:11:...   us-east-1a   🟢 in
  AMIs

▼ Elastic Block Store
  Volumes
  Snapshots
  Lifecycle Manager      ◀                                                                                    ▶

▼ Network & Security       Select a volume above                                                     ▬▬  ▬▢  ▢▬

  Security Groups  New
  Elastic IPs  New
  Placement Groups  New

---

aws    Services ▾    Resource Groups ▾    📌                    🔔    CIrving ▾    N. Virginia ▾    Support ▾

Volumes > Create Volume

## Create Volume

Volume Type    | Provisioned IOPS SSD (io1)    ▾ | ℹ

Size (GiB)    | 100 |    (Min: 4 GiB, Max: 16384 GiB)    ℹ

IOPS    | 3000 |    (Min: 100 IOPS, Max: 64000 IOPS)    ℹ

Availability Zone*    | us-east-1a    ▾ | ℹ

Throughput (MB/s)    Not applicable  ℹ

Snapshot ID    | Select a snapshot      I    ▾ |    🔄 ℹ

Multi-Attach    ☐  Enable  ℹ

---

🔍 Filter by tags and attributes or search by keyword                    ❓    |< <    1 to 4 of 4

☐  Name    ▾   Volume ID   ▾   Size   ▾   Volume Type   ▾   IOPS   ▾   Snapshot   ▾   Created   ▾   Availability Zone   ▾   St

☑  DataDisk1      vol-04db334...   100 GiB   io1      3000              July 9, 2020 at 8:58...   us-east-1a      🟢

### Attach Volume                                                                            ✕

Volume    ℹ     vol-04db3345df62fc226 (DataDisk1) in us-east-1a

Instance    ℹ    | i-07b1fc0eb1f88c9e5 |    in us-east-1a

Device    ℹ    | xvdf        I |

Windows Devices: xvdf through xvdp

                                                            Cancel    **Attach**

Volumes: | vo                                                              ▬▬  ▬▢  ▢▬

Description

                                                            3

# Creating the EBS Volumes Using the CLI



```
D:\>aws ec2 create-volume --volume-type gp2 --size 80 --availability-zone us-east-1a
{
    "AvailabilityZone": "us-east-1a",
    "CreateTime": "2020-08-03T15:29:10+00:00",
    "Encrypted": false,
    "Size": 80,
    "SnapshotId": "",
    "State": "creating",
    "VolumeId": "vol-0112234ebea00b6c4",
    "Iops": 240,
    "Tags": [],
    "VolumeType": "gp2",
    "MultiAttachEnabled": false
}


D:\>
```



```
D:\>aws ec2 create-volume --volume-type io1 --iops 1000 --snapshot-id snap-043db07b3ca09cd40 --av
ilability-zone us-east-1a

    "AvailabilityZone": "us-east-1a",
    "CreateTime": "2020-08-03T15:32:11+00:00",
    "Encrypted": false,
    "Size": 80,
    "SnapshotId": "snap-043db07b3ca09cd40",
    "State": "creating",
    "VolumeId": "vol-0545ae0528ecb9821",
    "Iops": 1000,
    "Tags": [],
    "VolumeType": "io1",
    "MultiAttachEnabled": false

D:\>
```

# Creating the EBS Volumes Using PowerShell

```
Administrator: Windows PowerShell                                          —  □  ×
PS D:\> New-EC2Volume -Size 50 -AvailabilityZone us-east    -VolumeType gp2

Attachments        : {}
AvailabilityZone   : us-east-1a
CreateTime         : 8/03/20 12:34:29 PM
Encrypted          : False
FastRestored       : False
Iops               : 150
KmsKeyId           :
MultiAttachEnabled : False
OutpostArn         :
Size               : 50
SnapshotId         :
State              : creating
Tags               : {}
VolumeId           : vol-0ba529de7d011fefc
VolumeType         : gp2


PS D:\>
```

```
Administrator: Windows PowerShell                                          —  □  ×
PS D:\> Get-EC2Tag -Filter @{Name="resource-type";Value="volume"}

Key  ResourceId              ResourceType Value
---  ----------              ------------ -----
Name vol-0112234ebea00b6c4  volume        DataDisk2
Name vol-04db3345df62fc226  volume        DataDisk1
Name vol-0545ae0528ecb9821  volume        DataDisk3


PS D:\>
```

Get-EC2Volumes = for getting the volumes


## Working With Elastic File System

9. cloud hosted NSF (Network File System)

```
ec2-user@ip-172-31-81-86:~/efs                                            —  □  ×
[ec2-user@ip-172-31-81-86 ~]$ mkdir efs
[ec2-user@ip-172-31-81-86 ~]$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=104857
6,hard,timeo=600,retrans=2,noresvport 172.31.94.216:/ efs
[ec2-user@ip-172-31-81-86 ~]$ cd efs
[ec2-user@ip-172-31-81-86 efs]$ ▮                                    I
```

1. You are attempting to enable object locking for an S3 bucket but cannot enable the option. What is the most likely cause of the problem?
   - **Locking was not set at bucket creation time**

2. Which PowerShell cmdlet is used to list Elastic Block Store (EBS) volumes?
    - **Get-Ec2Volume**

3. You plan on archiving data in the AWS cloud using Glacier. What must be created first, in order to use Glacier?
    - **Vault**

4. Which AWS service is used by S3 transfer acceleration?
    - **CloudFront**

5. Which CLI command is used to upload content to an S3 bucket?
    - **aws s3 cp**

6. Which S3 storage class should be used for document archiving?
    - **Glacier**

7. You need to set S3 bucket object permissions, so that anybody can view a graphic logo. What should you do?
    - **Select object, click Make Public**

8. You have selected an S3 bucket folder and would like to modify the storage tier. What should you click?
    - **Actions/Change Storage Class**

9. Which service is offered by Amazon S3?
    - **Storage**

10. Which options are available with the Storage Gateway?
    - **File gateway**
    - **Tape gateway**

11. Which PowerShell cmdlet creates a new S3 bucket?
    - **New-S3Bucket**


12. Which PowerShell cmdlet is used to upload content to S3?
    - **Write-S3Object**


13. Which phrase best describes the purpose of S3 versioning?
    - **Document Managing**


14. You have created an Elastic Block Store (EBS) volume but it is not showing up in your Windows EC2 instance. What is the most likely cause of the problem?
    - **The volume is not attached to the instance**


15. You need to remotely map to an Elastic File System (EFS) in the AWS cloud. Which Linux command prefix should you use?
    - **Sudo mount**


16. Which CLI command is used to create a new Elastic Block Store (EBS) volume?
    - **aws ec2 create-volume**


17. Which CLI command is used to create a new S3 bucket?
    - **aws s3api create-bucket**


18. What is one use for S3 lifecycle policies?
    - **To automate archiving**