**Module 5**

**Storage and Database**

Instance stores and Amazon Elastic Block Store.

What is block storage?

* A place to store files e.g., your hard drive
* Block level storage behaves like hard drives
* A file being a series of bytes that are stored in blocks on disc
* When file is updated, the whole series of blocks aren’t all overwritten
* It updates just the pieces change

What is instance store?

* Is disk storage that is physically attached to the host computer for an EC2 instance, and therefore has the same lifespan as the instance.
* Provide temporary block level storage for an Amazon EC2 instance
* When the instance is terminated you lose any data in the instance store.

**Example of how instances stores work:**

**What is Amazon Elastic Block Store (Amazon EBS)**

* Is a service that provides block level storage volumes that you can use with Amazon EC2 instances.
* If you terminate the Amazon EC2 instance all the data on the attached EBS volume remains available.
* To create EBS volume you need to define the configuration (such as volume size and type) and provision it. After created it can attach to Amazon EC2 instance
* You can take incremental backups of EBS volumes by creating Amazon EBS snapshots

**EBS Snapshot**

* Is an incremental backup.
* This means that the first backup taken of a volume copy all the data.
* For subsequent backups only the data that have changed since the most recent snapshot are saved

**Incremental vs Full Backup**

* In which all the data in a storage volume copies each time a backup occurs
* The full backup includes data that has not changed since the most recent backup

**Different types of storages**

1. **Amazon Simple Storage Service (Amazon S3)**

* It is a data store that allows you to store and retrieve an unlimited amount of data at any scale
* Data is stored as object in a bucket
* Might be used to store images, videos, text files.
* The maximum object size that you can upload is five terabytes
* S3 can be used to host static website

**Different tiers of Data**

1. **S3 Standard**

* Comes with 11 nines of durability
* Means an object is stored in S3 standard has a 99.999999999 percentage
* It will remain intact after a period of one year

1. **S3 Frequent access or S3-A1**

* Used for data that is accessed less frequently but requires rapid access when needed
* Perfect place to store backups, disaster recovery files or any object that requires a long-term storage

**Object Storage**

* Each consist of data, metadata and key
* Data might be images, video, text documents, or any type of file
* Metadata contains information about what the data is, how it used, the object size
* Object key is its unique identifier

**Amazon S3 Storage classes**

* You pay only what you use
* Are purpose-built to provide the lowest cost storage for different access pattern

**Types of S3 Storage classes**

1. **S3 Intelligent**

* For automatic cost savings for data with unknown or changing access patterns

1. **S3 Standard**

* For frequently accessed data

1. **S3 Standard-Infrequent Access (S3 Standard-IA)/ S3 One Zone-Infrequent Access**

* For less frequently accessed data

1. **S3 Glacier Instant Retrieval**

* For achieve data that needs immediate access

1. **S3 Glacier Flexible Retrieval (Formerly S3 Glacier)**

* For rarely accessed long term data that does not require immediate access

1. **Amazon S3 Glacier Deep Archive (S3 Glacier Deep Archive)**

* For long-term achieve and digital preservation with retrieval in hours at the lowest level cost storage in the cloud.

**Factors to consider when choosing Amazon S3 storage class**

* How often you plan to retrieve data
* How available you need your data to be

**Differences**

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| Amazon S3 Standard | Amazon S3 Intelligent-Tiering (S3 Intelligent) | Amazon S3 Standard-Infrequent Access (S3 Standard-IA) | Amazon S3 Glacier Instant Retrieval | Amazon S3 Glacier Flexibility (Formerly S3 Glacier) | Amazon s3 Glacier Deep Achieve | S3 on Outputs |
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