AWS Storage Services

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Storage Types

Block Level (Basically binaries & software's can't modify or delete.)

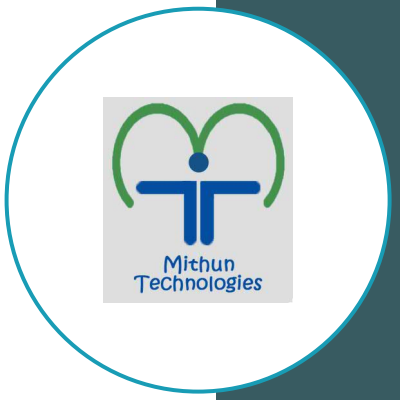
- EBS (Elastic Block Storage)
- Instance Stored Volumes.

Object Level (Users/application related files ex .doc,images,.pdf..etc.)

- S3

Storage Options

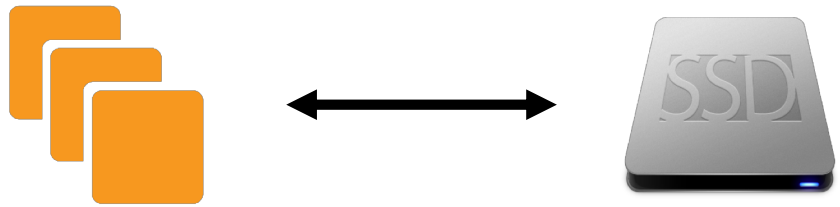
- EBS
- S3
- EFS
- Snow Ball
- Storage Gateway



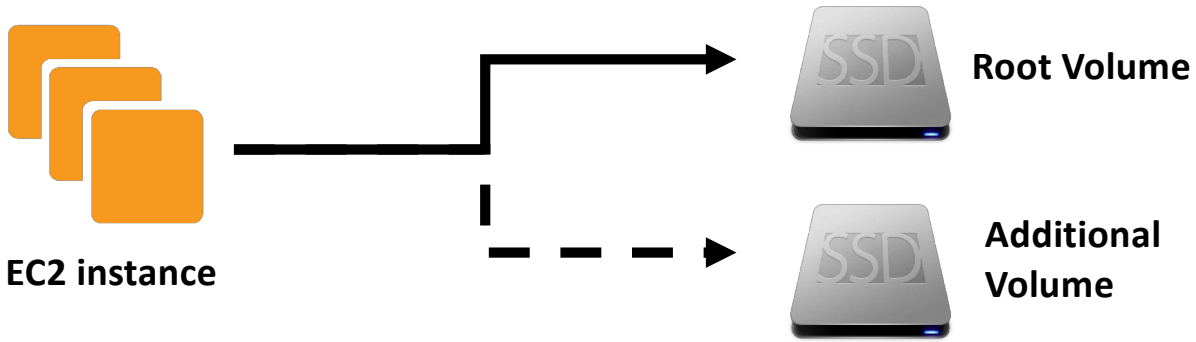
EBS (Elastic Block Storage)

- A block storage (so you need to format it). This means you are able to choose which type of file system you want.
- It is really fast
- It is relatively cheap
- With the new announcements from Amazon, you can store up to 16TB data per storage on SSD-s.
- You can snapshot an EBS (while it's still running) for backup reasons
- But it only exists in a particular region. Although you can migrate it to another region, you cannot just access it across regions (only if you share it via the EC2; but that means you have a file server)
- You need an EC2 instance to attach it to
- New feature (2017.Feb.15): You can now increase volume size, adjust performance, or change the volume type while the volume is in use. You can continue to use your application while the change takes effect.

- Every EC2 instance must have a “root” volume, which maybe or may not be EBS
- By default, EBS root volumes are set to be deleted when instance is terminated. However we can choose to keep it



- You can add more additional EBS volumes to the instance
- Any additional volume attached to the instance at any time, is not deleted when the instance is terminated



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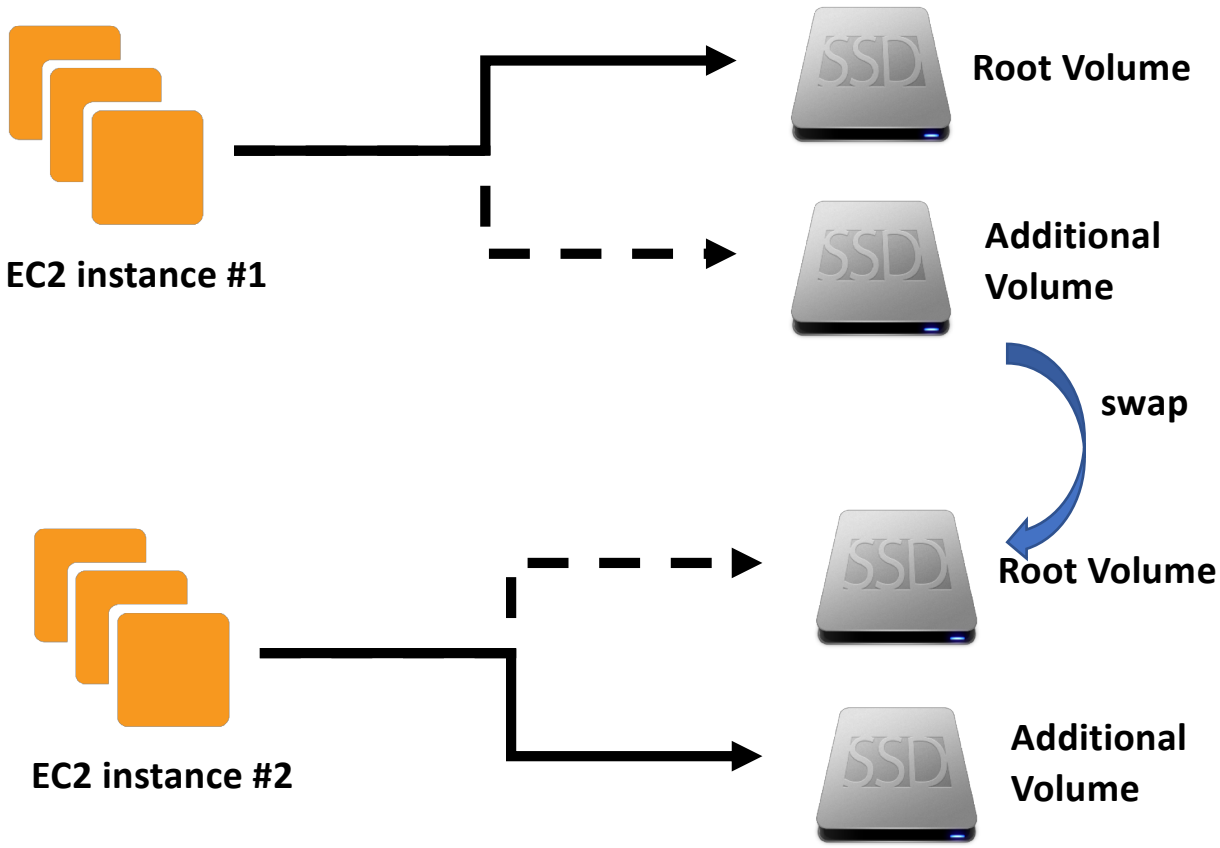
- **This means that you can swap EBS volumes between different EC2 Instances by "detaching" it from one & "attaching" it to another**



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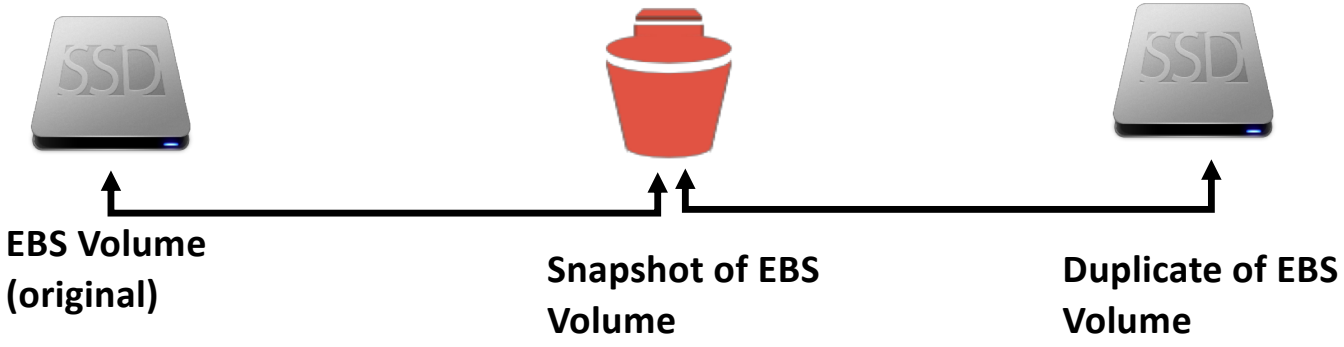
Snapshot

- A snapshot is an image of an EBS volume that can be stored as a backup
- Also can be used to create a duplicate EBS volume
- You cannot attach or detached a snapshot to an EC2 instance
- To restore a snapshot, we need to create a new EBS volume using the snapshot as the template



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EBS Volume Types

EBS General Purpose (SSD)

This volume type is suitable for small and medium workloads like Root disk EC2 volumes, small and medium database workloads, frequently logs accessing workloads, etc. By default, SSD supports 3 IOPS (Input Output Operations per Second)/GB means 1 GB volume will give 3 IOPS, and 10 GB volume will give 30 IOPS. Its storage capacity of one volume ranges from 1 GB to 1 TB. The cost of one volume is $0.10 per GB for one month.

Provisioned IOPS (SSD)

This volume type is suitable for the most demanding I/O intensive, transactional workloads and large relational, EMR and Hadoop workloads, etc. By default, IOPS SSD supports 30 IOPS/GB means 10GB volume will give 300 IOPS. Its storage capacity of one volume ranges from 10GB to 1TB. The cost of one volume is $0.125 per GB for one month for provisioned storage and $0.10 per provisioned IOPS for one month.

EBS Magnetic Volumes

It was formerly known as standard volumes. This volume type is suitable for ideal workloads like infrequently accessing data, i.e. data backups for recovery, logs storage, etc. Its storage capacity of one volume ranges from 10GB to 1TB. The cost of one volume is $0.05 per GB for one month for provisioned storage and $0. 05 per million I/O requests.

In EC2 instances, we store data in local storage which is available till the instance is running. However, when we shut down the instance, the data gets lost. Thus, when we need to save anything, it is advised to save it on Amazon EBS, as we can access and read the EBS volumes anytime, once we attach the file to an EC2 instance.

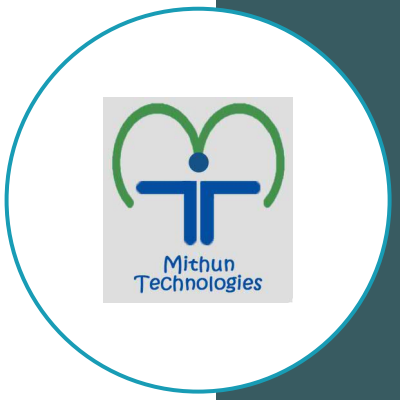
Amazon EBS Benefits

Reliable and secure storage − Each of the EBS volume will automatically respond to its Availability Zone to protect from component failure.

Secure − Amazon's flexible access control policies allows to specify who can access which EBS volumes. Access control plus encryption offers a strong defense-in-depth security strategy for data.

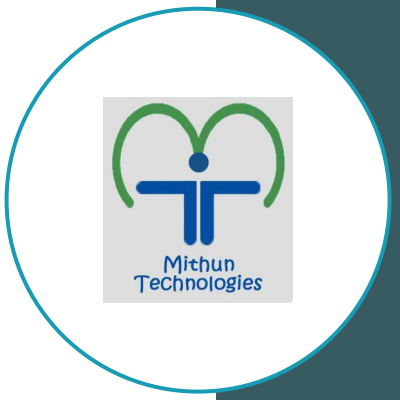
Higher performance − Amazon EBS uses SSD technology to deliver data results with consistent I/O performance of application.

Easy data backup − Data backup can be saved by taking point-in-time snapshots of Amazon EBS volumes.



S3 (Simple Storage Service)

- You can store files and "folders" but can't have locks, permissions etc like you would with a traditional file system
- This means, by default you can't just mount S3 and use it as your webserver
- But it's perfect for storing your images and videos for your website
- Great for short term archiving (e.g. a few weeks). It's good for long term archiving too, but Glacier is more cost efficient.
- Great for storing logs
- You can access the data from every region (extra costs may apply)
- Highly Available, Redundant. Basically data loss is not possible (99.999999999% durability, 99.9 uptime SLA)
- Much cheaper than EBS.
- You can serve the content directly to the internet, you can even have a full (static) website working direct from S3, without an EC2 instance.



Permissions

Policies

Life Cycles

Standard

IA (Infrequent Access)

RRS

Reduced Redundancy Storage (RRS) is an Amazon S3 storage option that enables customers to store noncritical, reproducible data at lower levels of redundancy than Amazon S3's standard storage

Glacier

Amazon Glacier is an extremely low-cost storage service that provides durable storage with security features for data archiving and backup. With Amazon Glacier, customers can store their data cost effectively for months, years, or even decades.

- Long term archive storage
- Extremely cheap to store
- Potentially very expensive to retrieve
- Takes up to 4 hours to "read back" your data (so only store items you know you won't need to retrieve for a long time)

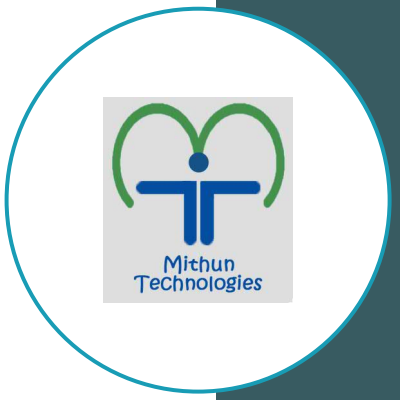
Cross Region Replication

File limit is 5TB

We can create max 100 s3 buckets in one account.

Amazon S3 Features

- **Low cost and Easy to Use** − Using Amazon S3, the user can store a large amount of data at very low charges.
- **Secure** − Amazon S3 supports data transfer over SSL and the data gets encrypted automatically once it is uploaded. The user has complete control over their data by configuring bucket policies using AWS IAM.
- **Scalable** − Using Amazon S3, there need not be any worry about storage concerns. We can store as much data as we have and access it anytime.
- **Higher performance** − Amazon S3 is integrated with Amazon CloudFront, that distributes content to the end users with low latency and provides high data transfer speeds without any minimum usage commitments.
- **Integrated with AWS services** − Amazon S3 integrated with AWS services include Amazon CloudFront, Amazon CLoudWatch, Amazon Kinesis, Amazon RDS, Amazon Route 53, Amazon VPC, AWS Lambda, Amazon EBS, Amazon Dynamo DB, etc.



Snow Ball

Snowball is a petabyte-scale data transport solution that uses devices designed to be secure to transfer large amounts of data into and out of the AWS Cloud. Using Snowball addresses common challenges with large-scale data transfers including high network costs, long transfer times, and security concerns.

With Snowball, you don’t need to write any code or purchase any hardware to transfer your data. Simply create a job in the AWS Management Console ("Console") and a Snowball device will be automatically shipped to you. Once it arrives, attach the device to your local network, download and run the Snowball Client ("Client") to establish a connection, and then use the Client to select the file directories that you want to transfer to the device. The Client will then encrypt and transfer the files to the device at high speed. Once the transfer is complete and the device is ready to be returned, the E Ink shipping label will automatically update and you can track the job status via Amazon Simple Notification Service (SNS),

Storage Gateway

Storage Gateway provides integration between the on-premises IT environment and the AWS storage infrastructure. The user can store data in the AWS cloud for scalable, data security features and cost-efficient storage.

Glacier, S3, EFS allocates the storage for you based on your usage, while at EBS you need to predefine the allocated storage. Which means, you need to over estimate. (However it's easy to add more storage to your EBS volumes, it requires some engineering, which means you always "overpay" your EBS storage, which makes it even more expensive)

		File Amazon EFS	**Object** Amazon S3	**Block** Amazon EBS
Performance	Per-operation latency	Low, consistent	Low, for mixed request types, and integration with CloudFront	Lowest, consistent
	Throughput scale	Multiple GBs per second	Multiple GBs per second	Single GB per second
Characteristics	Data Availability/Durability	Stored redundantly across multiple AZs	Stored redundantly across multiple AZs	Stored redundantly in a single AZ
	Access	One to thousands of EC2 instances or on-premises servers, from multiple AZs, concurrently	One to millions of connections over the web	Single EC2 instance in a single AZ
	Use Cases	Web serving and content management, enterprise applications, media and entertainment, home directories, database backups, developer tools, container storage, big data analytics	Web serving and content management, media and entertainment, backups, big data analytics, data lake	Boot volumes, transactional and NoSQL databases, data warehousing & ETL

Questions ?

Thank You
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