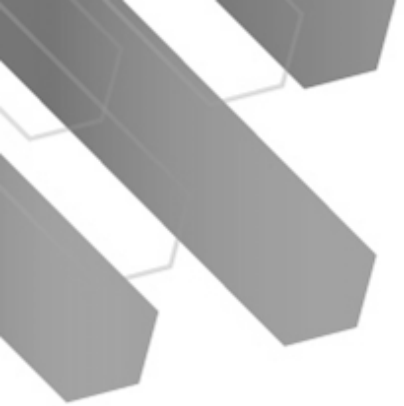
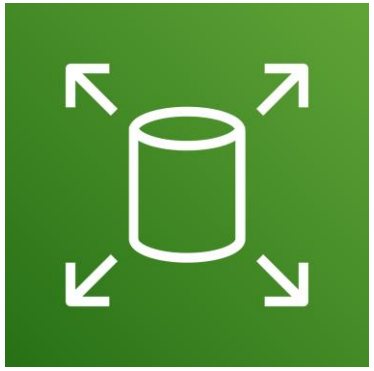


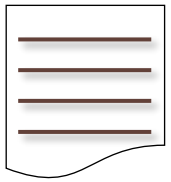
Amazon Elastic Block Store (Amazon EBS)

Storage

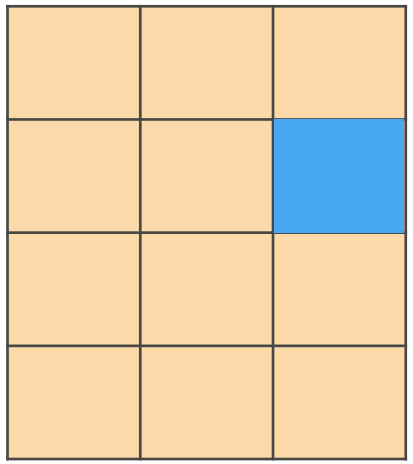


Amazon Elastic Block Store
(Amazon EBS)

AWS storage options: Block storage versus object storage

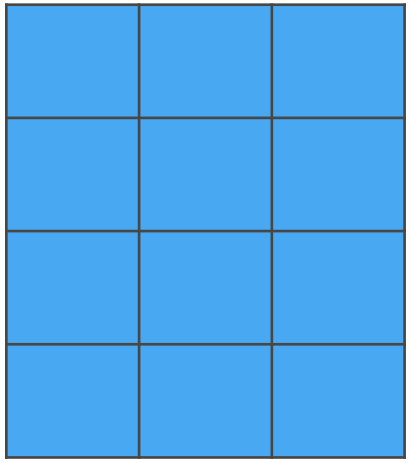


What if you want to change one character in a 1-GB file?



Block storage

Change one block (piece of the file) that contains the character



Object storage

Entire file must be updated

Amazon EBS

Amazon EBS enables you to **create individual storage volumes** and **attach them** to an Amazon EC2 instance:

- Amazon EBS offers block-level storage.
- Volumes are automatically replicated within its Availability Zone.
- It can be backed up automatically to Amazon S3 through snapshots.
- Uses include –
  - Boot volumes and storage for Amazon Elastic Compute Cloud (Amazon EC2) instances
  - Data storage with a file system
  - Database hosts
  - Enterprise applications

Amazon EBS volume types

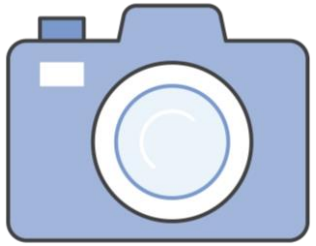
	Solid State Drives (SSD)		Hard Disk Drives (HDD)	
	General Purpose	Provisioned IOPS	Throughput-Optimized	Cold
Maximum Volume Size	16 TiB	16 TiB	16 TiB	16 TiB
Maximum IOPS/Volume	16,000	64,000	500	250
Maximum Throughput/Volume	250 MiB/s	1,000 MiB/s	500 MiB/s	250 MiB/s

Amazon EBS volume type use cases

Solid State Drives (SSD)		Hard Disk Drives (HDD)	
General Purpose	**Provisioned IOPS**	**Throughput-Optimized**	**Cold**
• This type is recommended for most workloads • System boot volumes • Virtual desktops • Low-latency interactive applications • Development and test environments	• Critical business applications that require sustained IOPS performance, or more than 16,000 IOPS or 250 MiB/second of throughput per volume • Large database workloads	• Streaming workloads that require consistent, fast throughput at a low price • Big data • Data warehouses • Log processing • It cannot be a boot volume	• Throughput-oriented storage for large volumes of data that is infrequently accessed • Scenarios where the lowest storage cost is important • It cannot be a boot volume

Amazon EBS features

- Snapshots –
  - Point-in-time snapshots
  - Recreate a new volume at any time
- Encryption –
  - Encrypted Amazon EBS volumes
  - No additional cost
- Elasticity –
  - Increase capacity
  - Change to different types



Amazon EBS: Volumes, IOPS, and pricing

1. **Volumes –**
   - Amazon EBS volumes persist independently from the instance.
   - All volume types are charged by the amount that is provisioned per month.
2. **IOPS –**
   - General Purpose SSD:
     - Charged by the amount that you provision in GB per month until storage is released.
   - Magnetic:
     - Charged by the number of requests to the volume.
   - Provisioned IOPS SSD:
     - Charged by the amount that you provision in IOPS (multiplied by the percentage of days that you provision for the month).

Amazon EBS: Snapshots and data transfer

3. **Snapshots –**
   - Added cost of Amazon EBS snapshots to Amazon S3 is per GB-month of data stored.

4. **Data transfer –**
   - Inbound data transfer is free.
   - Outbound data transfer across Regions incurs charges.

Elastic File System

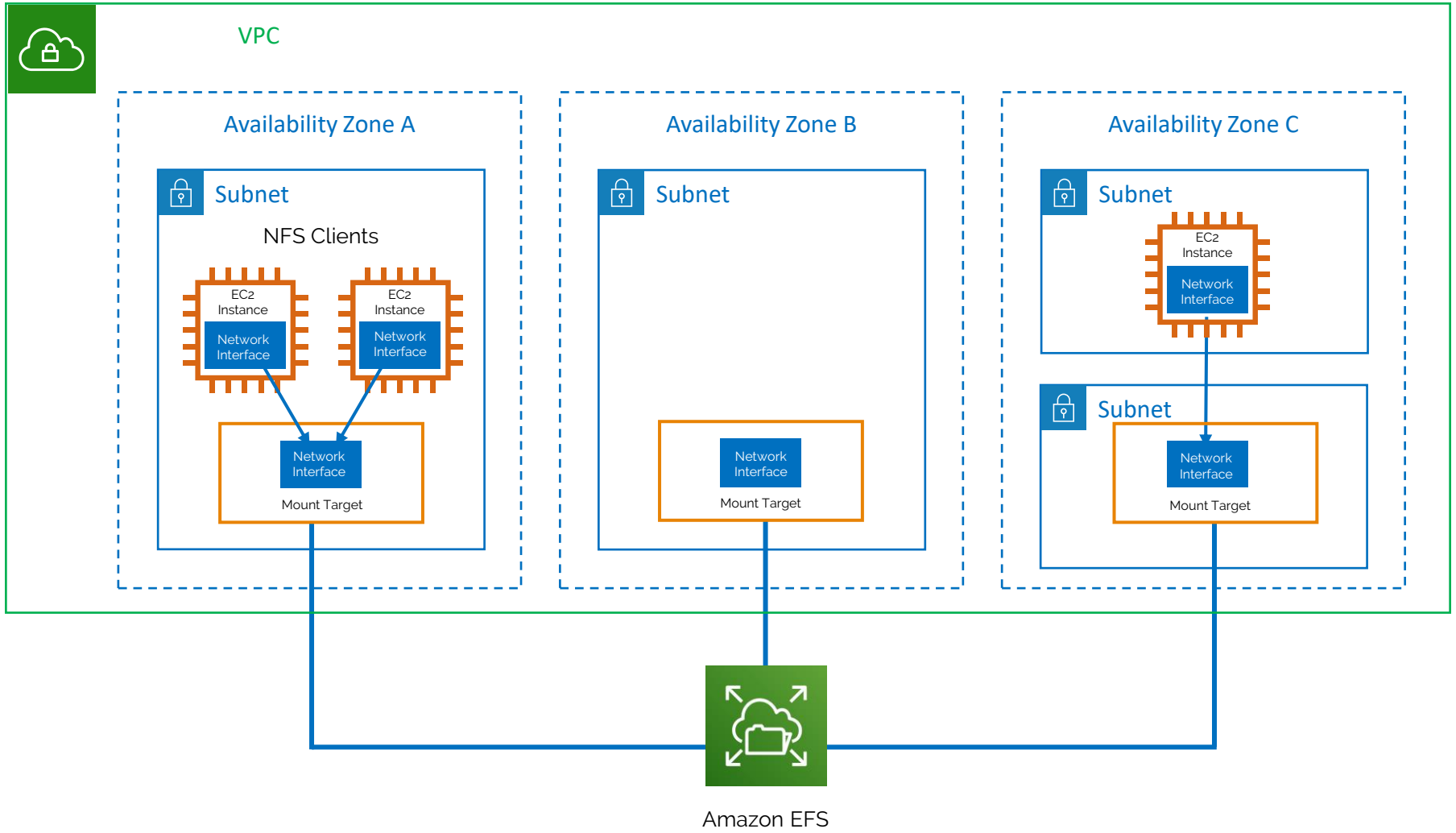
EFS

Amazon Elastic File System (Amazon EFS) provides simple, scalable, elastic file storage for use with AWS services and on-premises resources. It is easy to use and offers a simple interface that allows you to create and configure file systems quickly and easily.

Features

- Fully managed block storage service
- Concurrent Access from EC2 Instances
- Scale up to PB of data
- Supports only Linux distributions
- Supports NFS versions 4 and 4.1

EFS Architecture



EFS Setup Process

1. Create your Amazon EC2 resources and launch your instance/s.
2. Create your Amazon EFS file system.
3. In the appropriate subnet, create your target mounts.
4. Next, connect to your Amazon EC2 instance and mount the Amazon EFS file system

Configuration

- Performance
  - General - Ideal for latency-sensitive use cases
  - Max I/O Mode- When you connect with thousands of EC2 instances
- Throughput
  - Bursting Mode- Scales as file system grows
  - Provisioned – Independent of amount of data stored

Pricing: Billed on storage and provisioned throughput values

Review

- No minimum fee; Pay as you go
- Encryption in Transit and at Rest
- Mount on-premises servers
- Lifecycle Management (14,30,60,90 days)

Question #1

- What is one key difference between an Amazon EBS-backed and an instance-store backed instance?

- A. Virtual Private Cloud requires EBS backed instances
- B. Amazon EBS-backed instances can be stopped and restarted
- C. Auto scaling requires using Amazon EBS-backed instances.
- D. Instance-store backed instances can be stopped and restarted.

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Question #2

Company A has an S3 bucket containing premier content that they intend to make available to only paid subscribers of their website. The S3 bucket currently has default permissions of all objects being private to prevent inadvertent exposure of the premier content to non-paying website visitors. How can Company A provide only paid subscribers the ability to download a premier content file in the S3 bucket?

A. Apply a bucket policy that grants anonymous users to download the content from the S3 bucket

B. Generate a pre-signed object URL for the premier content file when a paid subscriber requests a download

C. Add a bucket policy that requires Multi-Factor Authentication for requests to access the S3 bucket objects

D. Enable server side encryption on the S3 bucket for data protection against the non-paying website visitors

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Question #3

EC2 instances are launched from Amazon Machine images (AMIs). A given public AMI can:

A. be used to launch EC2 Instances in any AWS region.

B. only be used to launch EC2 instances in the same country as the AMI is stored.

C. only be used to launch EC2 instances in the same AWS region as the AMI is stored.

D. only be used to launch EC2 instances in the same AWS availability zone as the AMI is stored

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