



BATCH : B107 AWS-DevOps
LESSON : AWS
DATE : 18.02.2023
SUBJECT : AWS-EBS

ZOOM GİRİŞLERİNİZİ LÜTFEN **LMS** SİSTEMİ ÜZERİNDEN YAPINIZ





Simple Storage Service S3 - 2



AWS Storage



STORAGE TYPES

BLOCK STORAGE



TRANSPORT:

FC or iSCSI

INTERFACE:

Direct Attached
or SAN

USE CASE:

Low Latency
Best for Structured Data

FILE STORAGE



TCP/IP

NFS, SMB

Good Performance
File Sharing, Global File Locking

OBJECT STORAGE



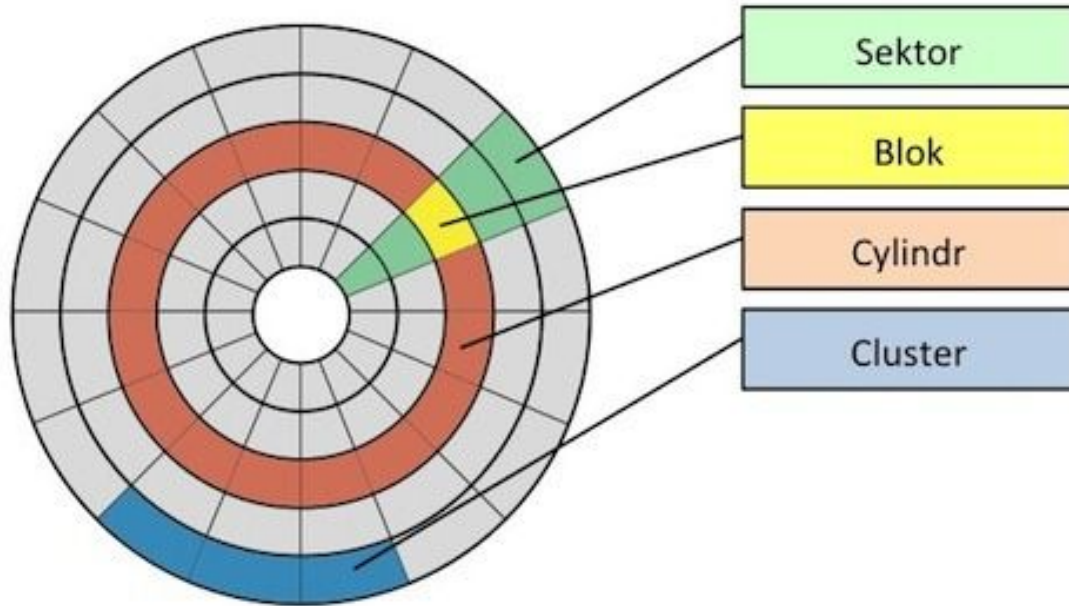
TCP/IP

HTTP, REST

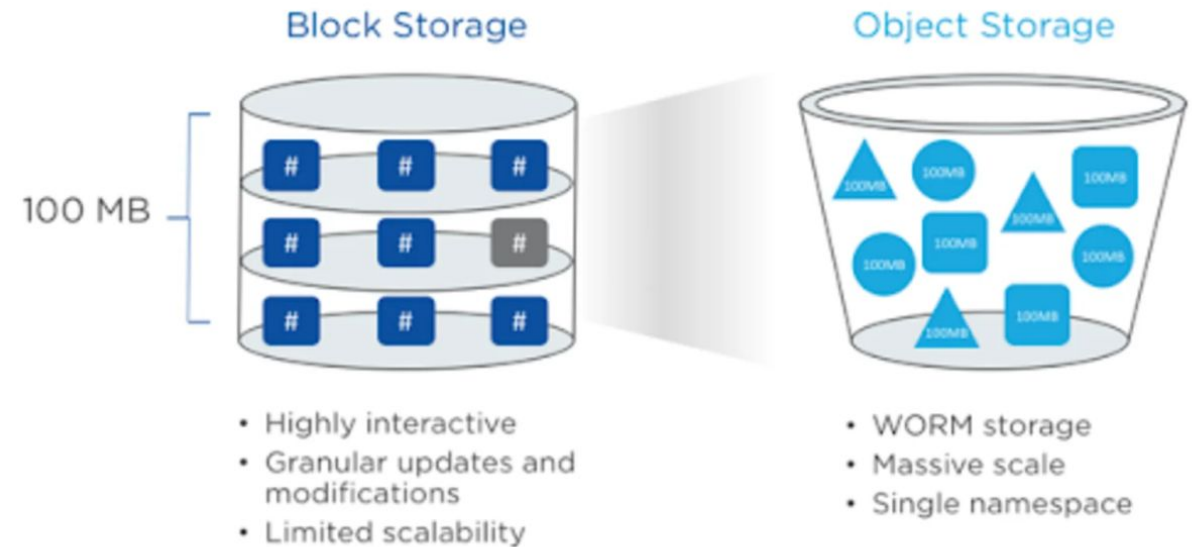
Easy Scaling with No Limits
Accessible across LAN & WAN



Block Storage



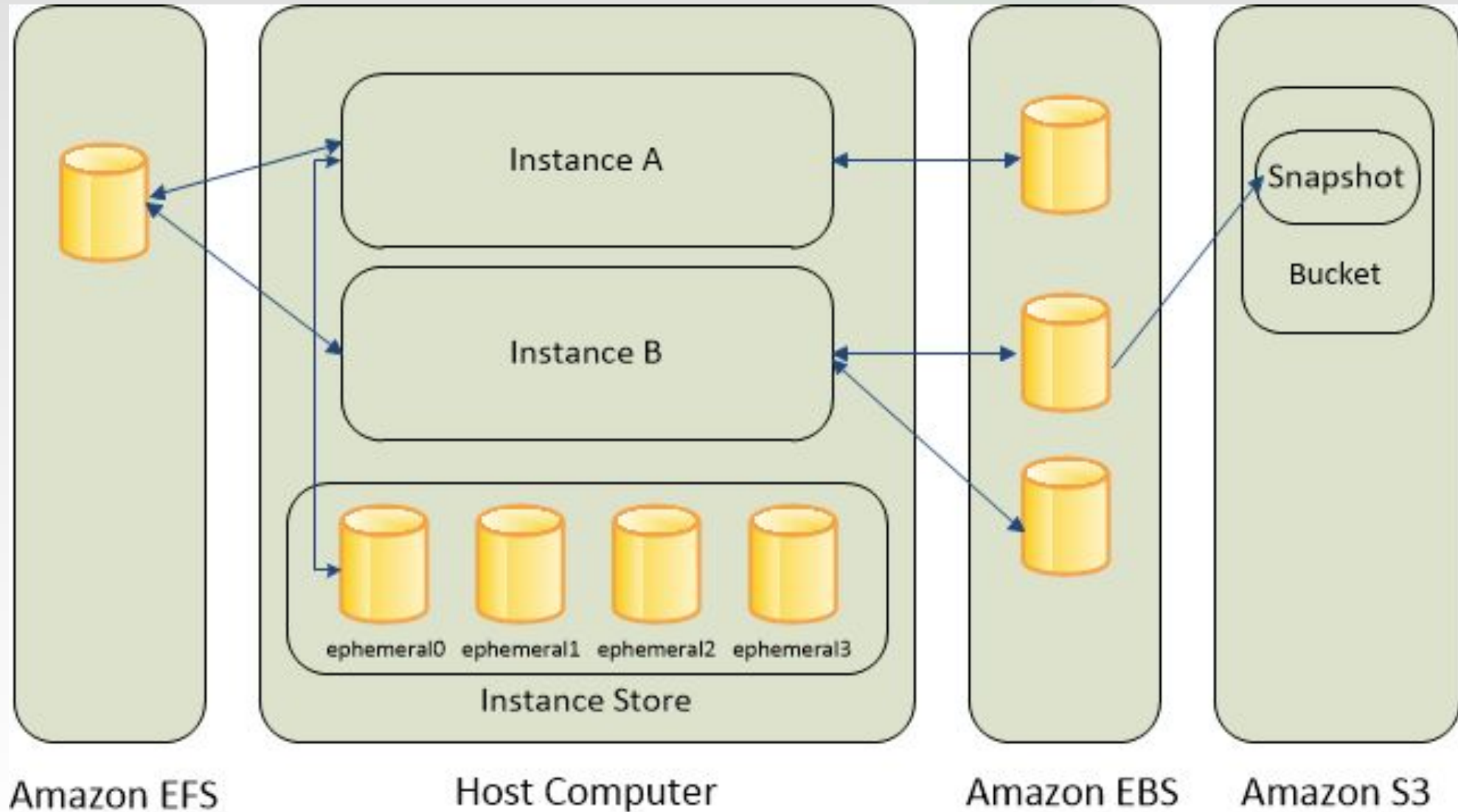
Block vs. Object: Handling a 100MB File(s)



- Block storage has data in blocks
- You can create, partition and format volumes
- Hard drives we use are block based storage devices



AWS Storage





What is Elastic Block Storage(EBS)?



EBS = Elastic Block Store

Amazon Elastic Block Store (Amazon EBS) provides block level storage volumes for use with EC2 instances.

✓ EBS volumes provide benefits that are not provided by instance store volumes.

Data availability

Data persistence

Data encryption

Data security

Snapshots

Flexibility



What is Elastic Block Storage(EBS)?



EBS

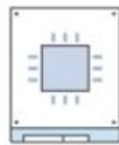
- EBS is like a network USB stick, it is not physically attached
- You can attach to an instance while it is running
- It can persist data after termination
- They can be attached to one instance (some io1, io2 types can be multi-attached)
- They are bound to a specific AZ
- EBS volume snapshot can be taken to use it in another AZ
- EBS volumes are automatically replicated within an AZ



EBS Instance Store **vs** EBS

EC2 Instance Store

- Local to instance
- Non-persistent data store
- Data not replicated (by default)
- No snapshot support
- SSD or HDD



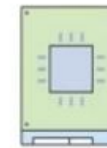
SSD



HDD

Elastic Block Store

- Persistent block storage volumes
- 99.999% availability
- Automatically replicated within its Availability Zone (AZ)
- Point-in-time snapshot support
- Modify volume type as needs change
- SSD or HDD
- Auto recovery



gp2



io1



st1



sc1



EBS Volume Types

- EBS Volumes come in 6 types
 - **gp2 / gp3 (SSD)**: General purpose SSD volume that balances price and performance for a wide variety of workloads
 - **io1 / io2 (SSD)**: Highest-performance SSD volume for mission-critical low-latency or high-throughput workloads
 - **st1 (HDD)**: Low cost HDD volume designed for frequently accessed, throughput-intensive workloads
 - **sc1 (HDD)**: Lowest cost HDD volume designed for less frequently accessed workloads
- EBS Volumes are characterized in Size | Throughput | IOPS (I/O Ops Per Sec)
- When in doubt always consult the AWS documentation – it's good!
- Only gp2/gp3 and io1/io2 can be used as boot volumes



EBS Volume Types - Solid state drives (SSD)

	General Purpose SSD		Provisioned IOPS SSD		
Volume type	gp3	gp2	io2 Block Express ‡	io2	io1
Durability	99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)	99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)	99.999% durability (0.001% annual failure rate)	99.999% durability (0.001% annual failure rate)	99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)
Use cases	<ul style="list-style-type: none">Low-latency interactive appsDevelopment and test environments		Workloads that require: <ul style="list-style-type: none">Sub-millisecond latencySustained IOPS performanceMore than 64,000 IOPS or 1,000 MiB/s of throughput	<ul style="list-style-type: none">Workloads that require sustained IOPS performance or more than 16,000 IOPSI/O-intensive database workloads	
Volume size	1 GiB - 16 TiB		4 GiB - 64 TiB	4 GiB - 16 TiB	
Max IOPS per volume (16 KiB I/O)	16,000		256,000	64,000 †	
Max throughput per volume	1,000 MiB/s	250 MiB/s *	4,000 MiB/s	1,000 MiB/s †	
Amazon EBS Multi-attach	Not supported		Supported		
Boot volume	Supported				



EBS Volume Types - Hard disk drives (HDD)

	Throughput Optimized HDD	Cold HDD
Volume type	st1	sc1
Durability	99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)	99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)
Use cases	<ul style="list-style-type: none">• Big data• Data warehouses• Log processing	<ul style="list-style-type: none">• Throughput-oriented storage for data that is infrequently accessed• Scenarios where the lowest storage cost is important
Volume size	125 GiB - 16 TiB	125 GiB - 16 TiB
Max IOPS per volume (1 MiB I/O)	500	250
Max throughput per volume	500 MiB/s	250 MiB/s
Amazon EBS Multi-attach	Not supported	Not supported
Boot volume	Not supported	Not supported



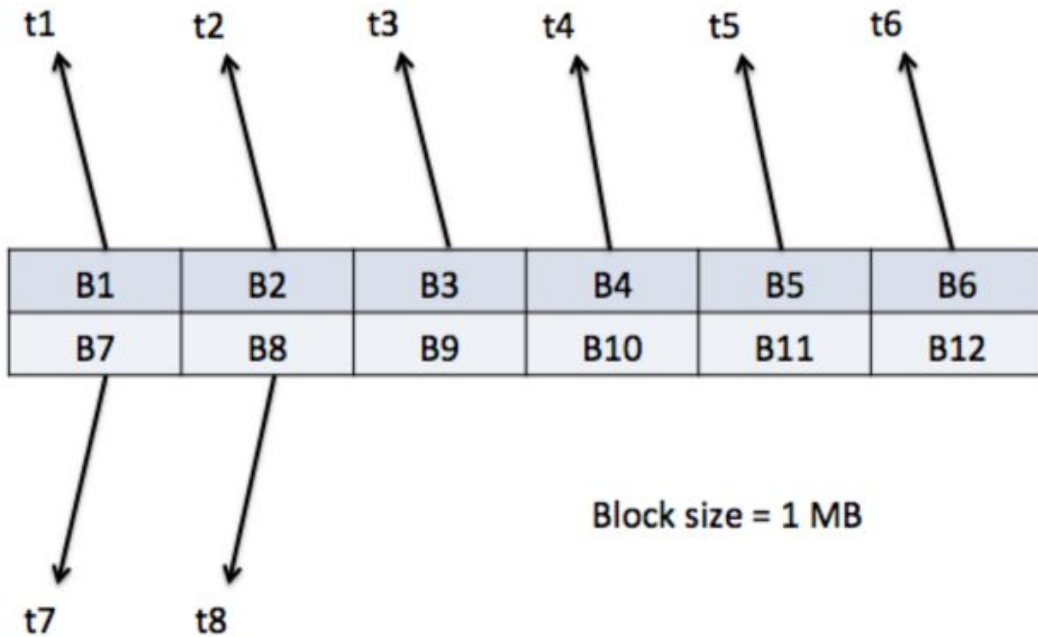
Storage Types

	Performance	Availability and Accessibility	Access Control	Storage and File Size Limits	Cost
Amazon S3	<ul style="list-style-type: none">- Supports 3500 PUT / LIST / DELETE requests per second- Scalable to 5500 GET requests per second	<ul style="list-style-type: none">- Usually 99.9% available- If lower, returns 10-100% of cost as service credits- Accessible via Internet using APIs	<ul style="list-style-type: none">- Access is based on IAM- Uses bucket policies and user policies- Public access via Block Public Access	<ul style="list-style-type: none">- No limit on quantity of objects- Individual objects up to 5TB	<ul style="list-style-type: none">- Free tier: 5GB- First 50 TB/month: \$0.023 per GB- Next 450 TB/month: \$0.022 per GB- Over 500 TB/month: \$0.021 per GB
AWS EBS	<ul style="list-style-type: none">- HDD volumes: 250-500 IOPS/volume depending on volume type- SSD volumes: 16-64K IOPS/volume	<ul style="list-style-type: none">- 99.99% available- Accessible via single EC2 instance	<ul style="list-style-type: none">- Security groups- User-based authentication (IAM)	<ul style="list-style-type: none">- Max storage size of 16TB- No file size limit on disk	<ul style="list-style-type: none">- Free tier: 30GB- General Purpose: \$0.045 per GB/month- Provisioned SSD: \$0.125 per GB/month, \$0.065 per IOPS/month
AWS EFS	<ul style="list-style-type: none">- 3GB/s baseline performance- Up to 10GB/s- Up to 7K IOPS	<ul style="list-style-type: none">- No publicly available SLA- Up to 1,000 concurrent EC2 instances- Accessible from any AZ or region	<ul style="list-style-type: none">- IAM user-based authentication- Security groups	<ul style="list-style-type: none">- 16TB per volume- 52TB maximum for individual files	<ul style="list-style-type: none">- Standard storage: \$0.30-\$0.39 per GB-month depending on region- Infrequent storage: \$0.025-\$0.03 per GB-month- Provisioned throughput: \$6 per MB/s-month

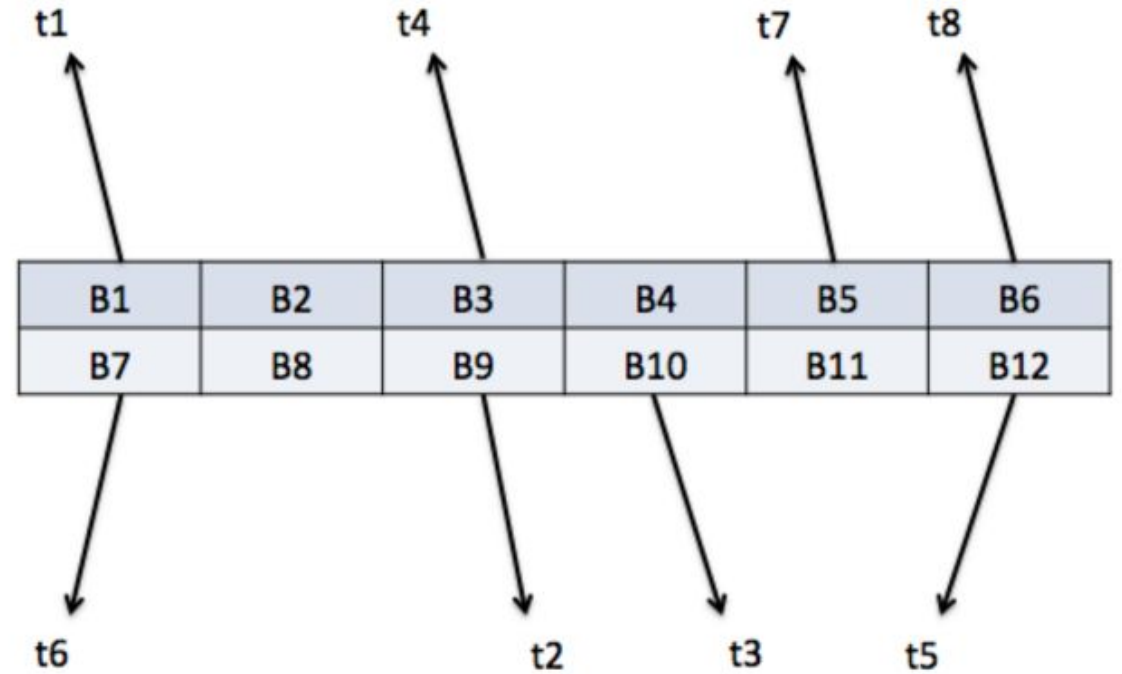


Throughput (HDD) vs IOPS (SSD)

Throughput (HDD)



IOPS (SSD)





Throughput (HDD) vs IOPS (SSD)





HDD - SSD



HDD

VS



SSD



Solution Architect Cases

1

**We need a high performance storage solution for our test purposes. Data losses do not matter.
What is your solution?**

2

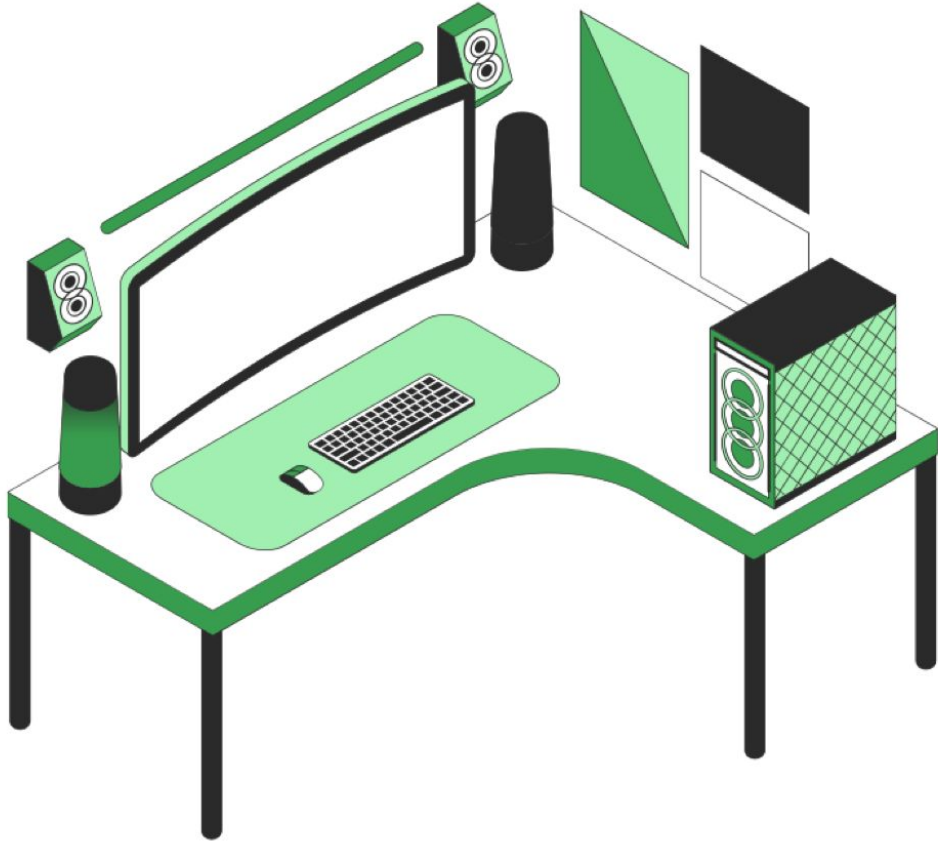
**We have an EBS volume in us-east-1 region. We need to move it to eu-west-1.
What is the best approach?**

3

**We need an EBS storage that can support OS.
What is your advice?**

4

**You have launched an EC2 instance with two EBS volumes, Root volume type and the other EBS volume type to store the data. A month later you are planning to terminate the EC2 instance.
What's the default behavior that will happen to each EBS volume?**



Do you
have any
questions?

Send it to us! We hope you learned
something new.