

Instructor Notes:

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AWS Storage Services

Lesson 04: [AWS Storage services](#)



Instructor Notes:

This lesson is to give an Introduction on Java Server Pages

Lesson Objectives



In this lesson, you will learn:

- Amazon EBS
- Amazon S3
- Amazon Glacier
- AWS Storage gateway

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Amazon EBS
Amazon S3
Amazon Glacier
AWS Storage gateway

Instructor Notes:

4.1: Amazon EBS Amazon Storage Services



Cloud storage is a very crucial section of Cloud computing.

Big data analytics, data warehouses, Internet of Things, databases, and backup and archive applications all rely on some form of data storage architecture.

As compare to traditional on-premises storage systems ,Cloud storage is more reliable, scalable, and secure.



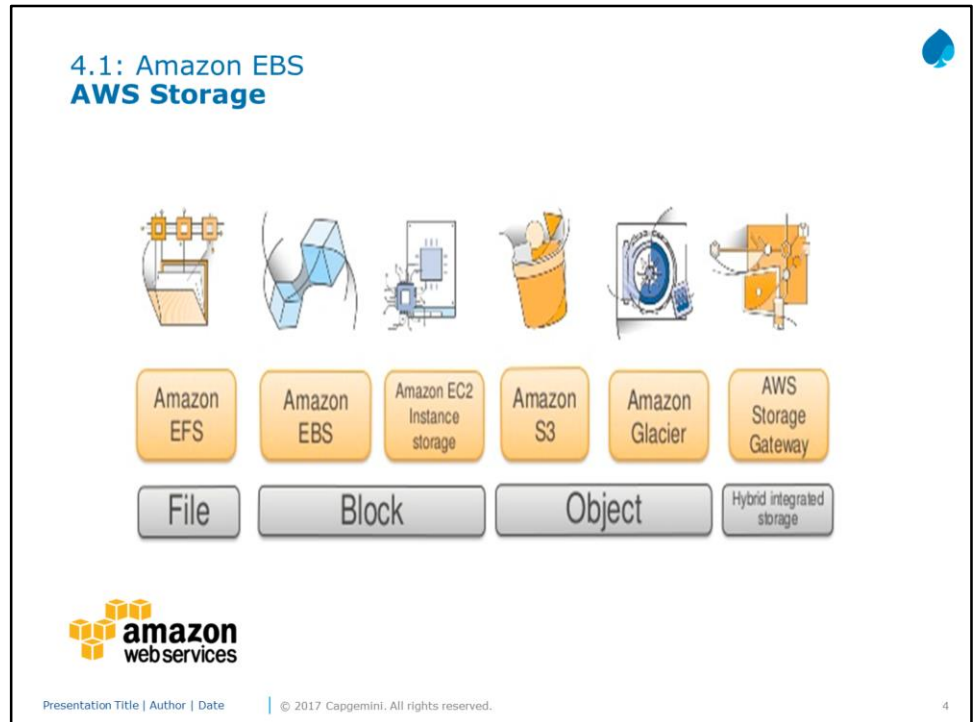
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Cloud storage is a critical component of cloud computing, holding the information used by applications. Big data analytics, data warehouses, Internet of Things, databases, and backup and archive applications all rely on some form of data storage architecture. Cloud storage is typically more reliable, scalable, and secure than traditional on-premises storage systems.

AWS offers a complete range of cloud storage services to support both application and archival compliance requirements. Select from object, file, and block storage services as well as cloud data migration options to start designing the foundation of your cloud IT environment.

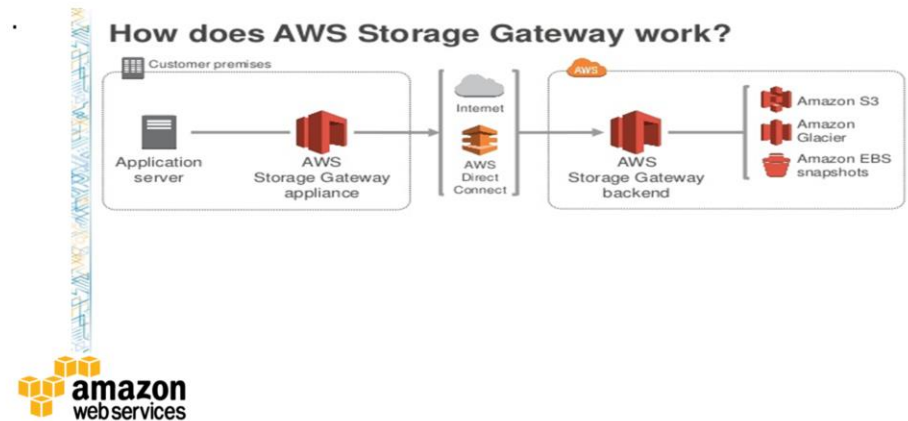
Instructor Notes:

AWS provides Select from object, file, and block storage services as well as cloud data migration options to start designing the foundation of your cloud IT environment

Instructor Notes:

4.1: Amazon EBS Amazon Storage Services

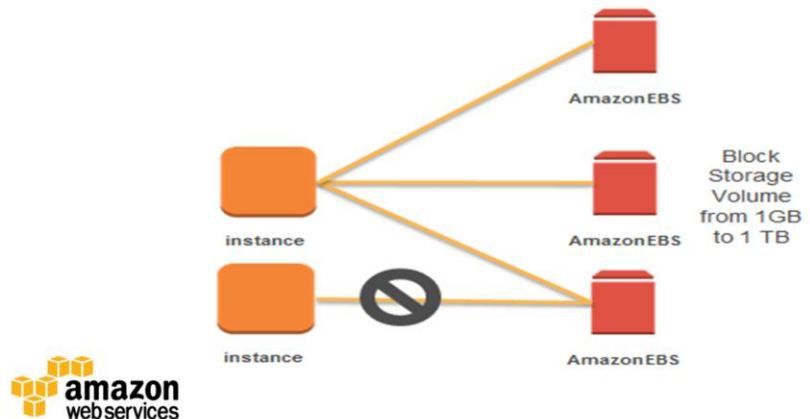
AWS offers a complete range of cloud storage services to support both application and archival compliance requirements .



Instructor Notes:

4.1: Amazon EBS Amazon EBS(Elastic Block Storage)

It provides persistent block storage volumes for use with Amazon EC2 instances in the AWS and it is private to the instances.



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Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability.

One can attach multiple volumes to single EC2 instance in the same AZ.

One can Mount EBS as drives in EC2 instance and whenever required can be formatted.

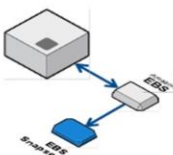
Each Amazon EBS volume is automatically replicated within its Availability Zone to protect the user from any component failure.

It offers high availability and durability .

Instructor Notes:



4.1: Amazon EBS

Amazon EBS - Features



High performance block storage device
Mount as drives to instances
Persistent and independent of instance lifecycle

Feature	Details
High performance file system	Mount EBS as drives and format as required
Flexible size	Volumes from 1GB to 1TB in size
Secure	Private to your instances
Available	Replicated within an Availability Zone
Backups	Volumes can be snapshotted for point in time restore
Monitoring	Detailed metrics captured via Cloud Watch



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Amazon EBS encryption offers seamless encryption of EBS data volumes, boot volumes and snapshots, eliminating the need to build and manage a secure key management infrastructure.

Dynamically increase capacity, tune performance, and change the type of live EBS volumes. Elastic Volumes allows you to dynamically increase capacity, tune performance, and change the type of any new or existing current generation volume with no downtime or performance impact.

By using Amazon CloudWatch with AWS Lambda you can automate volume changes to meet the changing needs of your applications.

Instructor Notes:

4.1: Amazon EBS Amazon EBS - Features



It allows to choose between SSD-backed or HDD-backed volumes which can deliver the performance one need for most demanding applications.

Volumes can be snapshotted for point in time and restore

At no additional charge , Amazon EBS volume data is replicated across multiple servers in an Availability Zone to prevent the loss of data from the failure of any single component. This makes EBS volumes 20 times more reliable than typical commodity disk drives.

Access to Amazon EBS volumes is integrated with AWS Identity and Access Management (IAM). IAM enables access control to your Amazon EBS volumes.

EBS is private to one's EC2 instance



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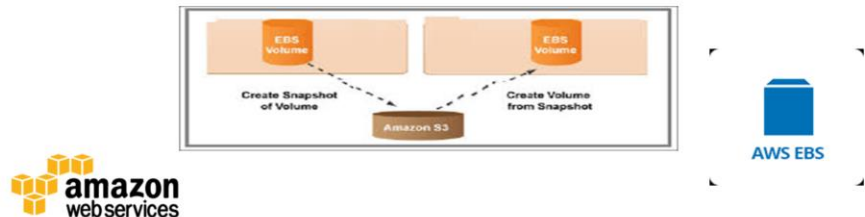
4.1: Amazon EBS Amazon EBS Snapshots

Amazon EBS provides the ability to save point-in-time snapshots of your volumes to Amazon S3.

Amazon EBS Snapshots are stored incrementally.

When one delete a snapshot, he/she removes only the data not needed by any other snapshot.

Snapshots can be used to instantiate multiple new volumes, expand the size of a volume, or move volumes across Availability Zones.



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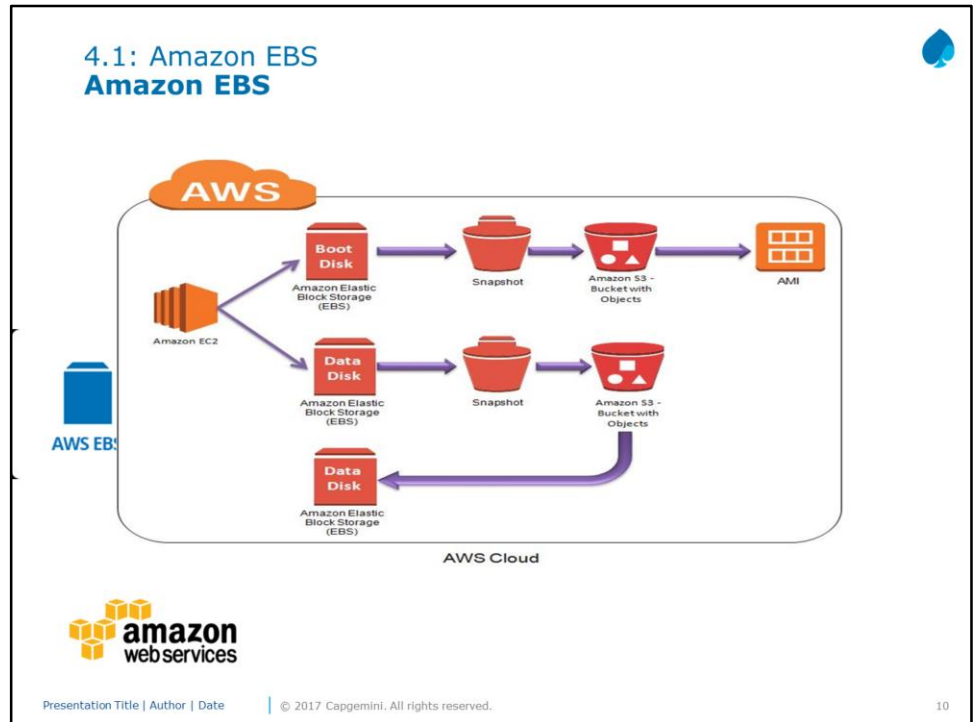
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Amazon EBS Snapshots are stored incrementally: only the blocks that have changed after your last snapshot are saved, and you are billed only for the changed blocks. If you have a device with 100 GB of data but only 5 GB has changed after your last snapshot, a subsequent snapshot consumes only 5 additional GB and you are billed only for the additional 5 GB of snapshot storage, even though both the earlier and later snapshots appear complete.

When one delete a snapshot :-

All active snapshots contain all the information needed to restore the volume to the instant at which that snapshot was taken. The time to restore changed data to the working volume is the same for all snapshots.


Instructor Notes:

Instructor Notes:

4.1: Amazon EBS Demo

Demo on:

- Amazon EBS (Refer Steps in Note section)



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Step 1 : Go to EC2 dashboard and click on Volume
Step 2 : Click on Create volume
Step 3 : Select Volume type and Add a Tag
Step 4 : Click on Create Volume button
Step 5 : Select the volume and attach it
Step 6 : Note the Linux Device path

Step 7 : Click on Attach button

For Mounting your Volume , Go to Putty and type the below command

Step 1 : lsblk
Step 2 : sudo file -s /dev/xvdf

Step 3 : sudo file -s /dev/xvda1

Step 4 : sudo mkfs -t ext4 /dev/xvdf

Step 5 : sudo mkdir /data

Instructor Notes:

4.2: Amazon S3 Amazon S3(Simple Storage Service)



- Amazon S3 is the storage for the Internet , which is designed to make web-scale computing easier for Developers .
- It provides a simple web services interface which can be used to store and retrieve any amount of data, at any time, from anywhere on the web(i.e. web sites, mobile apps, corporate applications, and data from IoT sensors or devices) .
- The service aims to maximize benefits of scale and to pass those benefits on to developers.



Instructor Notes:

4.2: Amazon S3 Amazon S3(Simple Storage Service)




- The container for objects stored in Amazon S3 is called an Amazon S3 bucket .
- Amazon S3 is the most supported cloud storage service available, with integration from the largest community of third-party solutions, systems integrator partners, and other AWS services.
- Store and retrieves digital files.
- Amazon S3 allows you to run sophisticated Big Data analytics on your data without moving the data into a separate analytics system




Instructor Notes:

4.2: Amazon S3
Amazon S3(Simple Storage Service)

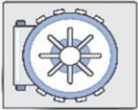
Choice of storage classes on Amazon S3



S3 Standard



S3 Standard – Infrequent Access




Amazon Glacier

Active data
Milliseconds
\$0.021/GB/mo

Infrequently accessed data
Milliseconds
\$0.0125/GB/mo

Archive data
Minutes to Hours
\$0.004/GB/mo





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Instructor Notes:

4.2: Amazon S3 Demo

Demo on:

- Creating Amazon S3 bucket and upload a file into Bucket



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Follow the steps to Create a S3 Bucket and upload the file into the bucket

Step 1 : Choose S3 under storage service and click on Create Bucket button

Step 2 : Provide a Bucket Name and choose the Region

Step 3 : Click on Next

Step 4: Don't change anything in SetProperties window and click Next

Step 5: You can add one more Account and click on Read permission click on Save button

Step 6 : If you want give the public read permission to this bucket and click on Next

Step 7: Review it and click on Create Bucket button

Step 8: Close this window and see your Bucket from list

Step 9: Click on your Bucket and go to properties tab

Step 10 : Click on Static web hosting tab

Step 11 : choose "use this bucket to host your web site "

Step 12 : Provide the index document name and click on Save button

Step 13 : Come to Overview tab and choose a file and upload it

Step 14 : Click on the file you uploaded

Step 15 : Click on make public button

Step 16: Click on the link and see your file

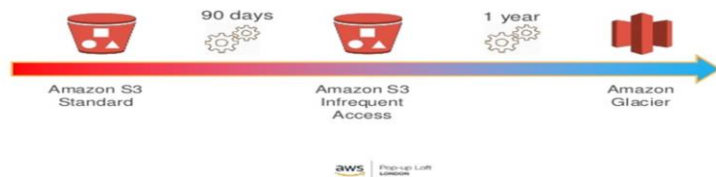
Instructor Notes:

4.3: Amazon Glacier

Amazon Glacier

- Amazon Glacier is an extremely low-cost storage service that provides secure and durable storage for data archiving and backup .
- It is the storage for infrequently accessed data .

Automate Lifecycle policies Transition



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- Even lower cost than Amazon S3 with Same high durability.
- With Amazon Glacier, customers can reliably store large or small amounts of data for as little as \$0.01 per gigabyte per month, which is always better than on-premises solutions

Instructor Notes:

4.3: Amazon Glacier Amazon Glacier

- Amazon Glacier allows us to pay only for what we use.



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- Amazon Glacier allows us to pay only for what we use.
- For data archiving and backup no need to pay any upfront money. one can pay the low price for storage, and can scale your usage up or down as needed.
- It is easy to use.
- Amazon Glacier is the only cloud archive storage service that allows you to query data in place and retrieve only the subset of data you need from within an archive

Instructor Notes:

4.3: Amazon Glacier

Amazon Glacier


Flexible Data Retrieval Options

All of your Glacier data is accessible with any of three retrieval options.

Expedited Retrieval	Standard Retrieval	Bulk Retrieval
<ul style="list-style-type: none">• Rare urgent access• 1-5 minutes• \$0.03/GB	<ul style="list-style-type: none">• Current model• 3-5 hours• \$0.01/GB	<ul style="list-style-type: none">• Batch/Bulk access• 5-12 hours• \$0.0025/GB

On-site tape replacement

Off-site tape replacement



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Just Say No :--

- capital investment
- No commitment
- No capacity planning
- No idle capacity
- No onerous media handling
- No complex technology refreshes
- No undifferentiated heavy lifting

Instructor Notes:

4.4: Amazon Storage gateway **AWS Storage gateway**



- It is a hybrid storage service which enables the on-premises applications to seamlessly use AWS cloud storage.
- It provides three interface in a data center and it connects those three interface to AWS storage.
 - Files
 - Volumes
 - Tapes

It brings the AWS storage to your application by using a standard protocol.



Instructor Notes:

4.4: Amazon Storage gateway AWS Storage gateway



Storage Gateway – Files, volumes, and tapes

**File gateway NFS (v3 and v4.1) interface**
On-premises file storage backed by Amazon S3 objects

**Volume gateway iSCSI block interface**
On-premises block storage backed by S3 with EBS snapshots

**Tape gateway iSCSI virtual tape library interface**
Virtual tape storage in Amazon S3 and Glacier with VTL management



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Iscli - Internet Small Computer Systems Interface, an Internet **Protocol** (IP)-based storage networking standard for linking data storage facilities. It provides block-level access to storage devices by carrying SCSI commands over a TCP/IP network.

NFS :-- Network File System (**NFS**) is a distributed file system **protocol** originally developed by Sun Microsystems in 1984, allowing a user on a client computer to access files over a computer network much like local storage is accessed. **NFS**, like many other **protocols**, builds on the Open Network Computing Remote Procedure Call ...

Instructor Notes:

4.4: Amazon Storage gateway AWS File Storage gateway

- The File Gateway configuration offers on-premises servers and applications a network file share via an NFS connection.

For the local performance ,File data is cached on the File Gateway and converted to objects stored in Amazon S3.



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- The File Gateway configuration offers on-premises servers and applications a network file share via an NFS connection.

For the local performance ,File data is cached on the File Gateway and converted to objects stored in Amazon S3.

In the data center Data moves to AWS storage through a Protocol called as NFS

Instructor Notes:

4.4: Amazon Storage gateway AWS Volume Storage gateway

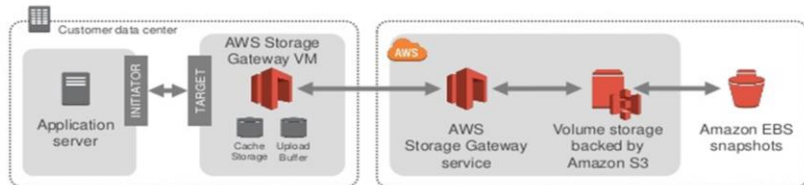
Volume Gateway – Cached

Primary data stored in AWS

Frequently accessed data cached on-premises

Point-in-time backups stored as Amazon EBS snapshots

Up to 32 volumes, up to 32 TB each, for up to 1 PB per gateway



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Instructor Notes:

Summary



In this lesson, you have learnt:

- Amazon EBS
- Amazon S3
- Amazon Glacier
- AWS Storage gateway

Instructor Notes:**Answers for the Review Questions:**

Answer 1: Amazon Storage gateway

Answer 2: Amazon S3 Bucket

Review – Questions



Question 1: _____ is a hybrid storage service which enables the on-premises applications to seamlessly use AWS cloud storage .

Question 2 : The container for objects stored in Amazon S3 is called an _____ .

Instructor Notes:**Answers for the
Review Questions:**

Answer 3 AWS
Glacier

Answer 4: Option 1

Review – Questions



- Question 3: _____ AWS storage basically stores the for infrequently accessed data and lower cost than Amazon S3 .

- Question 4: Which is the AWS Block storage ?
 - Option 1 : Amazon EBS
 - Option 2 : Amazon S3
 - Option 3 : Amazon Glacier
 - Option 4 : Amazon Cloudfront