

AWS Technical Essentials

Lesson 3—Storage and Content Delivery



WHAT YOU'LL LEARN

- Six Amazon Data Storage Offers
- Elastic Block Storage of AWS



Amazon Data Storage Offers

Amazon Simple Storage Service (Amazon S3)

Amazon CloudFront

Amazon Elastic File System (Amazon EFS)

Amazon Glacier

Amazon Storage Gateway

Amazon Import/Export

Amazon S3

Amazon S3 provides safe and secure object storage to developers.



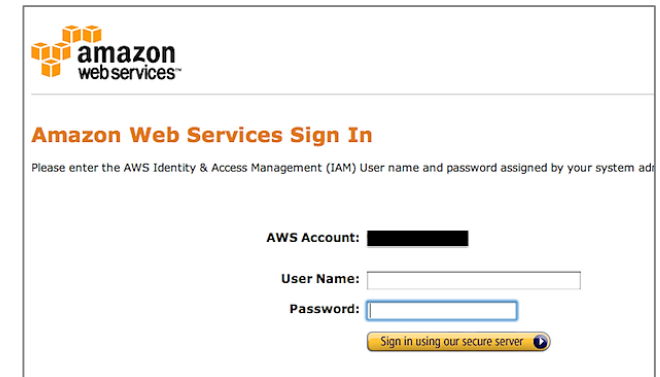
User-Friendly Interface



Storing and Accessing Data



Internet

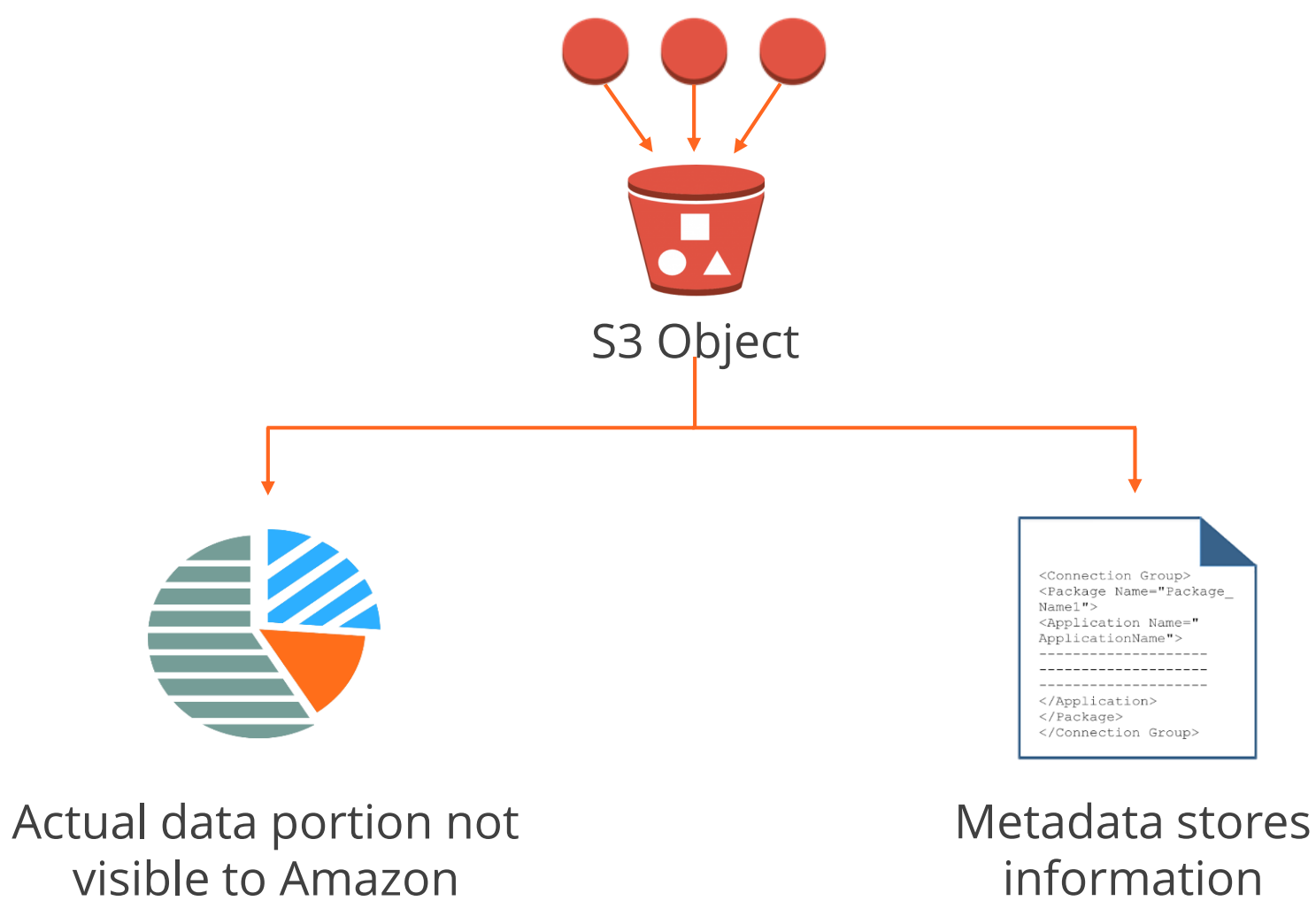


AWS Account



A file in the Amazon S3 parlance is referred to as an object.

Object Representation



Set Metadata

Cancel

Upload to: All Buckets / businessbucketlogfiles

Metadata: Add metadata to all of the objects you upload. You can specify common HTTP headers, such as Content-Type and Content-Disposition, as well as custom metadata for these.

☒ Figure out content types automatically

No metadata added...

+ Add more metadata

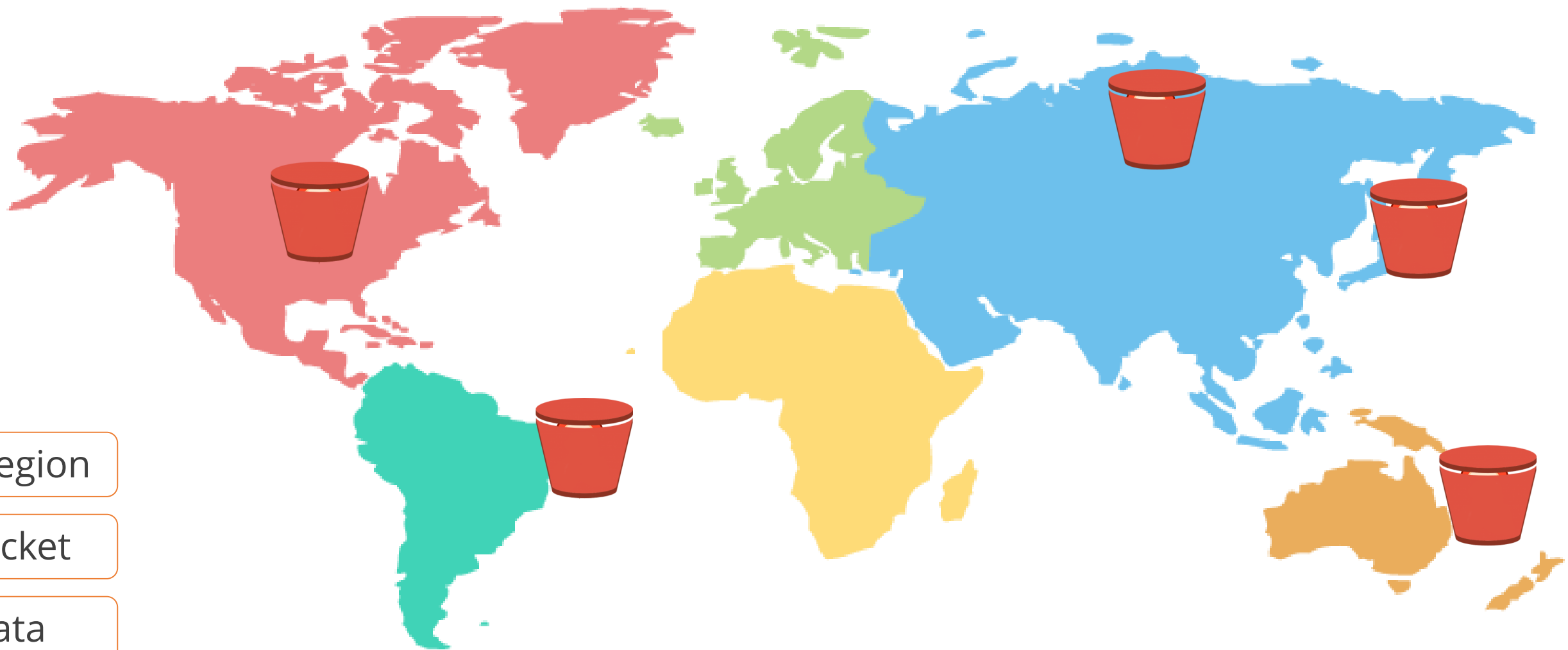
- Remove selected metadata

< Set Permissions

Start Upload

Cancel

Amazon S3 Bucket and Objects



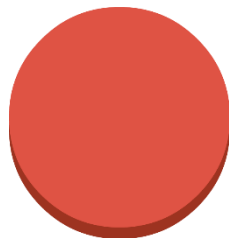
- Select the region
- Create a bucket
- Store the data

Amazon S3 Bucket and Objects



Amazon S3 Bucket

- Enables you to store one or more objects
- Account holders can create a maximum of 100 buckets
- Logical container for multiple objects



Object

- Identified by a key
- Size can be up to 5TB



- Access permissions for objects and buckets can be set through suggested terms and policies.
- Access logs can be maintained to keep a track of the buckets used.



Demo 01—Creating an Amazon S3 Bucket

(Refer to the E-Learning course: Screen Number – 3.3)

Demonstrate how to create an Amazon S3 Bucket.



Demo 02—Managing Logging in an Amazon S3 Bucket

(Refer to the E-Learning course: Screen Number – 3.4)

Demonstrate how to manage logging in an Amazon S3 Bucket.

Demonstrate how to delete or empty an Amazon S3 Bucket.

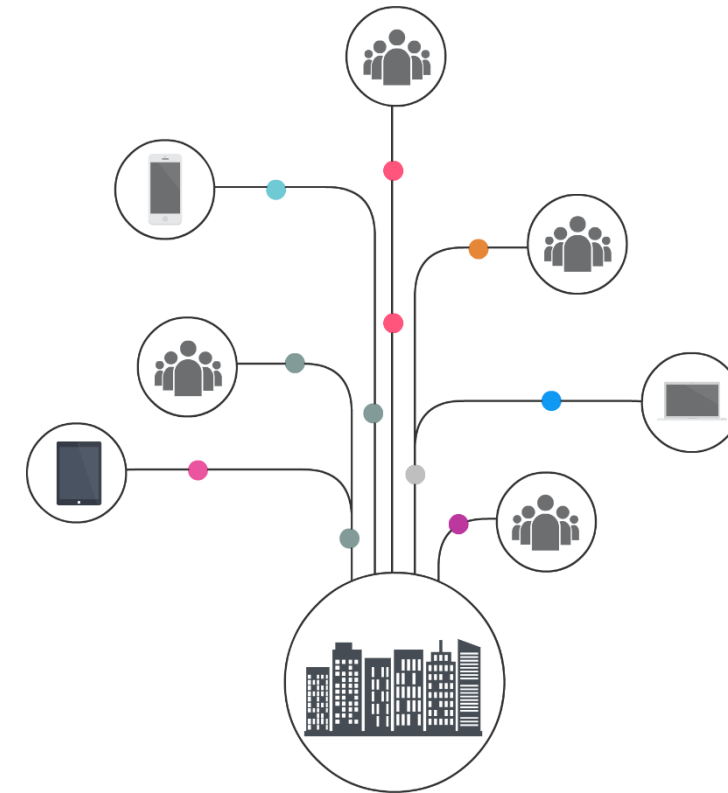
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Amazon S3 Process, Bucket usage and its objectives

Let's see the process of accessing AWS region, and use a bucket and its objects.



Desired region selected



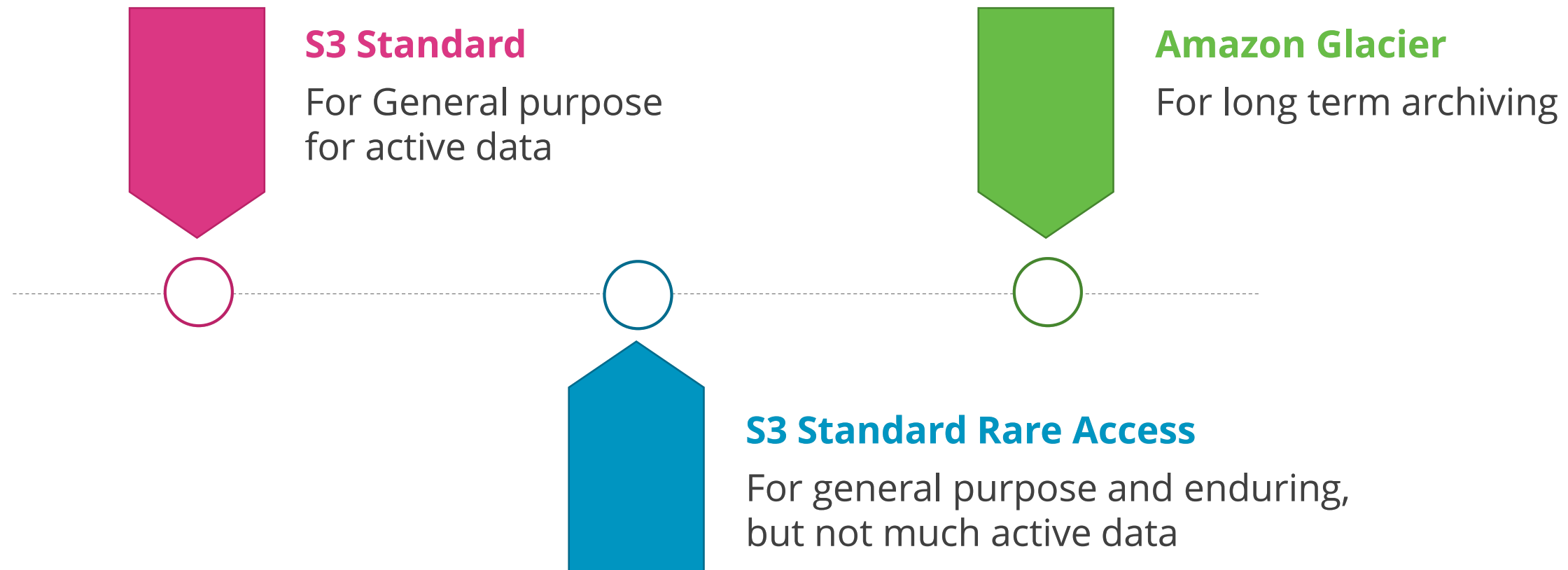
Duplicates on multiple devices, and facilities within the region

99.99 percent durability and availability of objects



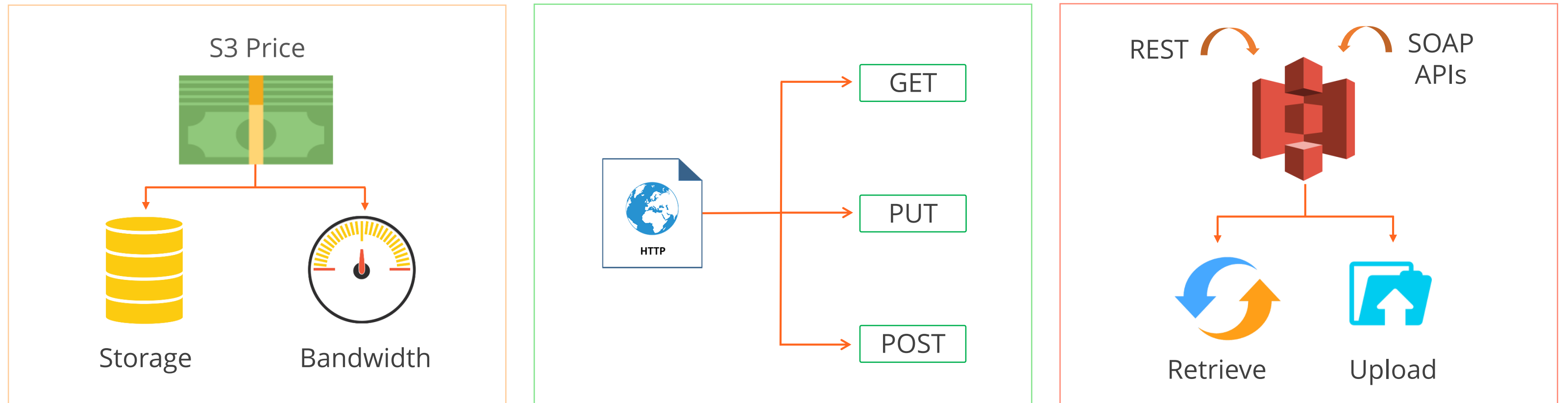
Low-priced Reduced Redundancy Storage helps duplicate objects across a small number of locations in a region.

Amazon S3 Storage Class



Amazon S3 offers configurable policies for handling data throughout its development. Once the policy is set, the data would be migrated to the most appropriate storage class and without any changes to the application.

Simple Storage Service Pricing



- Server-Side Encryption or AES-256 Standard can be used to encrypt stored objects.
- Security breaches while transacting data can be avoided using SSL connections.



Knowledge Check

KNOWLEDGE
CHECK
1

The object representation of a file consists of ____.

- a. long-term archiving
- b. the actual data portion
- c. disaster recovery
- d. the configurable lifecycle



KNOWLEDGE
CHECK
1

The object representation of a file consists of ____.

- a. long-term archiving
- b. the actual data portion
- c. disaster recovery
- d. the configurable lifecycle



The correct answer is **b.**

Explanation: The object representation of a file consists of the actual data portion not visible to Amazon.

KNOWLEDGE
CHECK
2

Amazon S3 Buckets allow you to enable access the logs.

- a. True
- b. False



KNOWLEDGE
CHECK
2

Amazon S3 Buckets allow you to enable access the logs.

- a. True
- b. False



The correct answer is **a.**

Explanation: Once you have created a bucket, you can enable or disable access logs from the Logging properties.

Amazon Data Storage Offers

Amazon Simple Storage Service (Amazon S3)

Amazon CloudFront

Amazon Elastic File System (Amazon EFS)

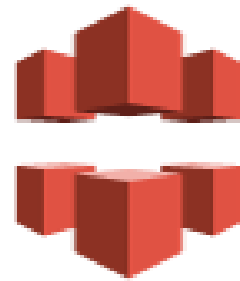
Amazon Glacier

Amazon Storage Gateway

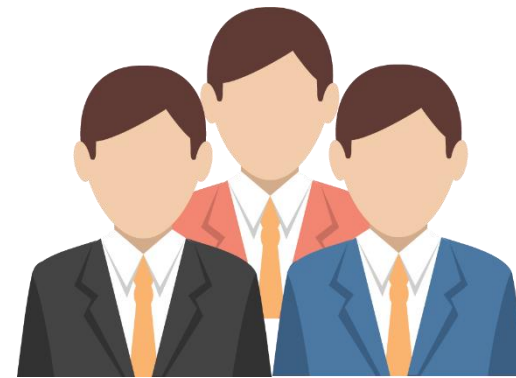
Amazon Import/Export

Amazon CloudFront

Amazon CloudFront is an economical, but a dynamic content delivery network, or CDN.

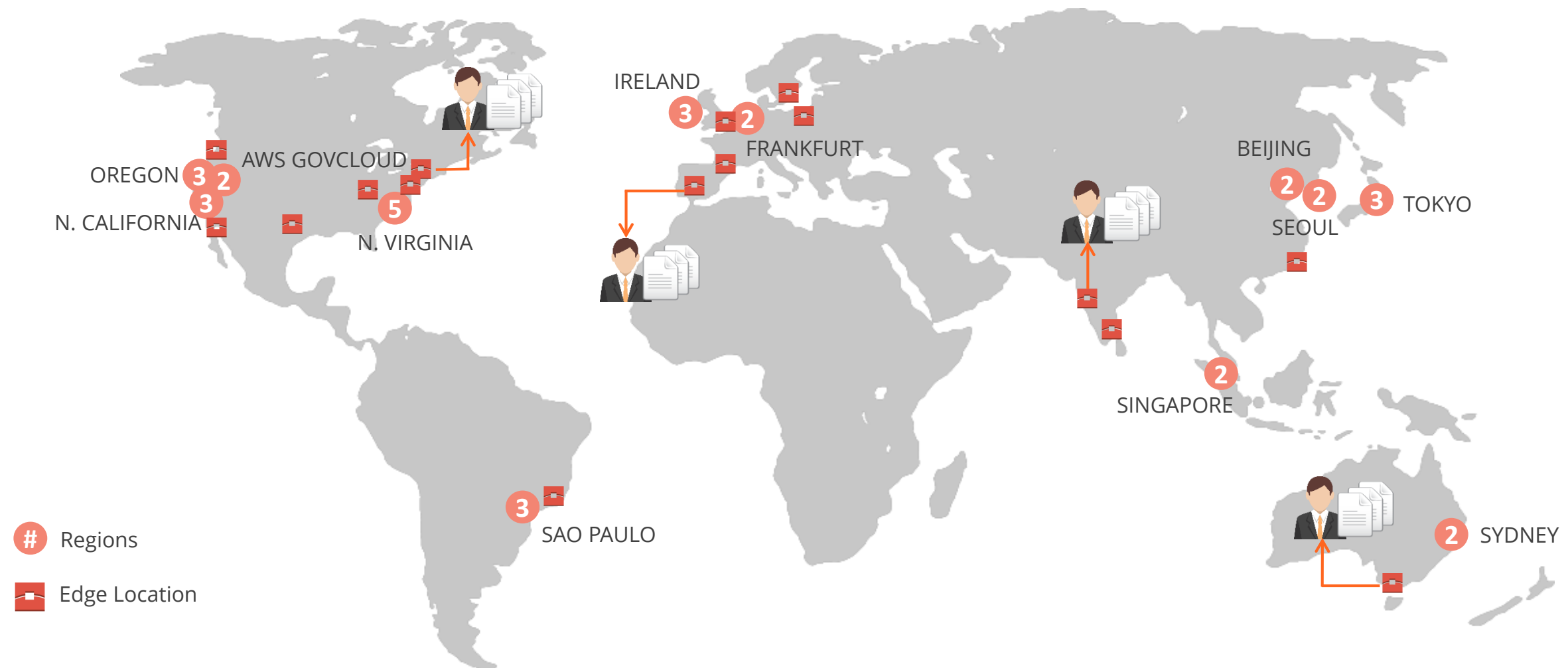


Amazon CloudFront



User Experience

Amazon CloudFront–Frequently Accessed Content



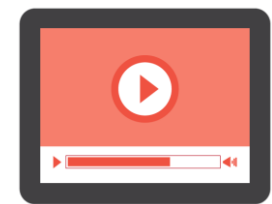
Edge locations refer to the boundaries between locations of major cloud servers.

CloudFront Working-Not Cached Content



Amazon Cloudfront Usage

Amazon CloudFront supports users requesting data using both web browsers and mobile devices. It is an ideal choice to distribute the frequently accessed static and dynamic content.



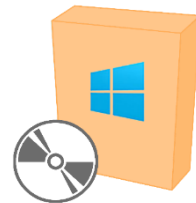
Videos



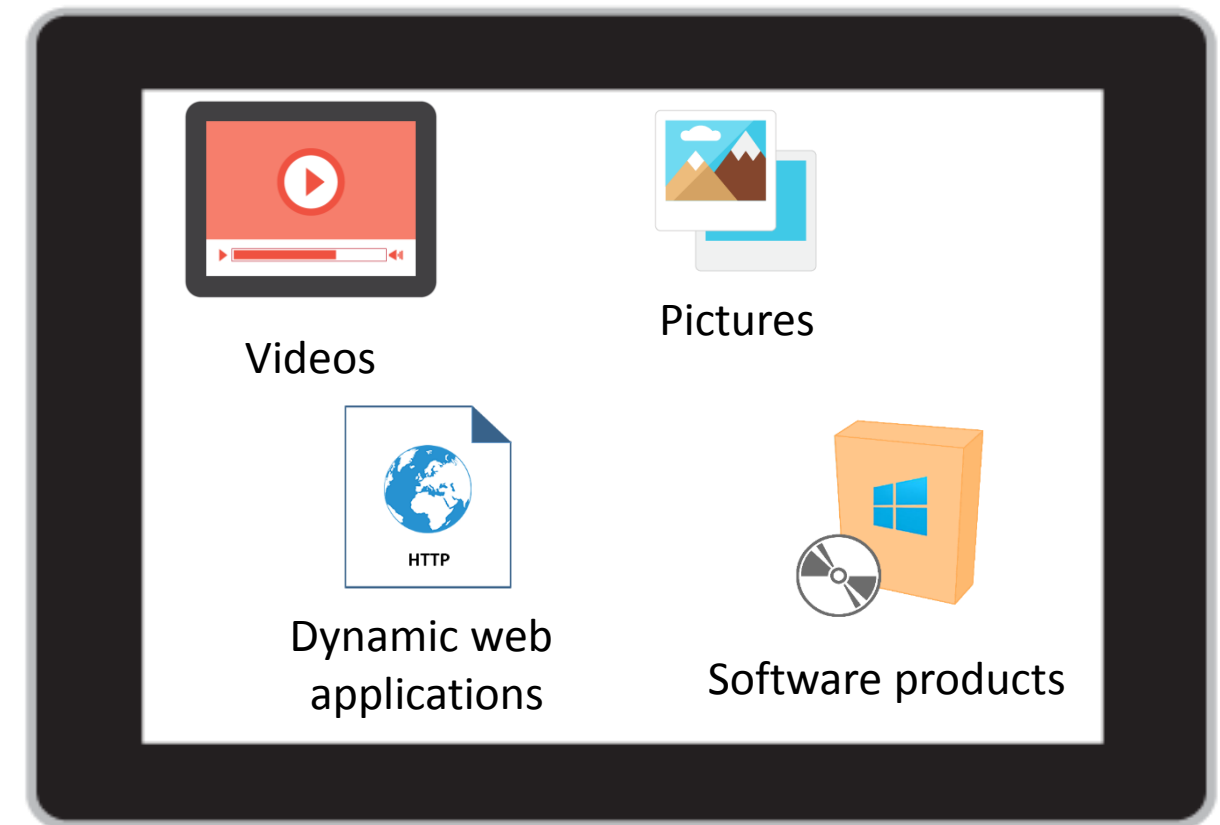
Pictures



Dynamic web applications



Software products



Mobile Device

Amazon CloudFront-Key Advantages

Ability to scale according to requirement

- No need to manage high-priced web servers for your web traffic needs.
- Start small, and grow as the traffic to your website increases.
- Automatically manages traffic load without any intervention.

Flexible cost model

- No minimum monthly commitment or a fixed-term contract.
- Pay only for the content you deliver using Amazon CloudFront.



Knowledge Check

KNOWLEDGE
CHECK
1

Edge locations refer to the boundaries between locations of major ____.

- a. cloud servers
- b. client physical servers
- c. client locations
- d. visitors



KNOWLEDGE
CHECK
1

Edge locations refer to the boundaries between locations of major ____.

- a. cloud servers
- b. client physical servers
- c. client locations
- d. visitors



The correct answer is **a.**

Explanation: Edge locations refer to the boundaries between locations of major cloud servers.

KNOWLEDGE
CHECK
2

From the following, identify the types of content that can be distributed using Amazon CloudFront.

- a. Videos
- b. Dynamic Web Applications
- c. Pictures
- d. All of the above



KNOWLEDGE
CHECK
2

From the following, identify the types of content that can be distributed using Amazon CloudFront.

- a. Videos
- b. Dynamic Web Applications
- c. Pictures
- d. All of the above



The correct answer is **d.**

Explanation: Amazon CloudFront is an ideal choice to distribute frequently accessed static and dynamic content such as videos, pictures, software products, and dynamic web applications over HTTP.

Amazon Data Storage Offers

Amazon Simple Storage Service (Amazon S3)

Amazon CloudFront

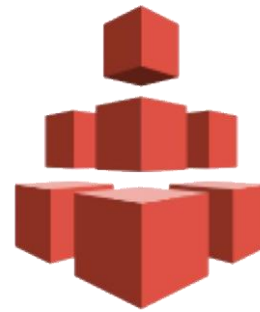
Amazon Elastic File System (Amazon EFS)

Amazon Glacier

Amazon Storage Gateway

Amazon Import/Export

Amazon Elastic File System

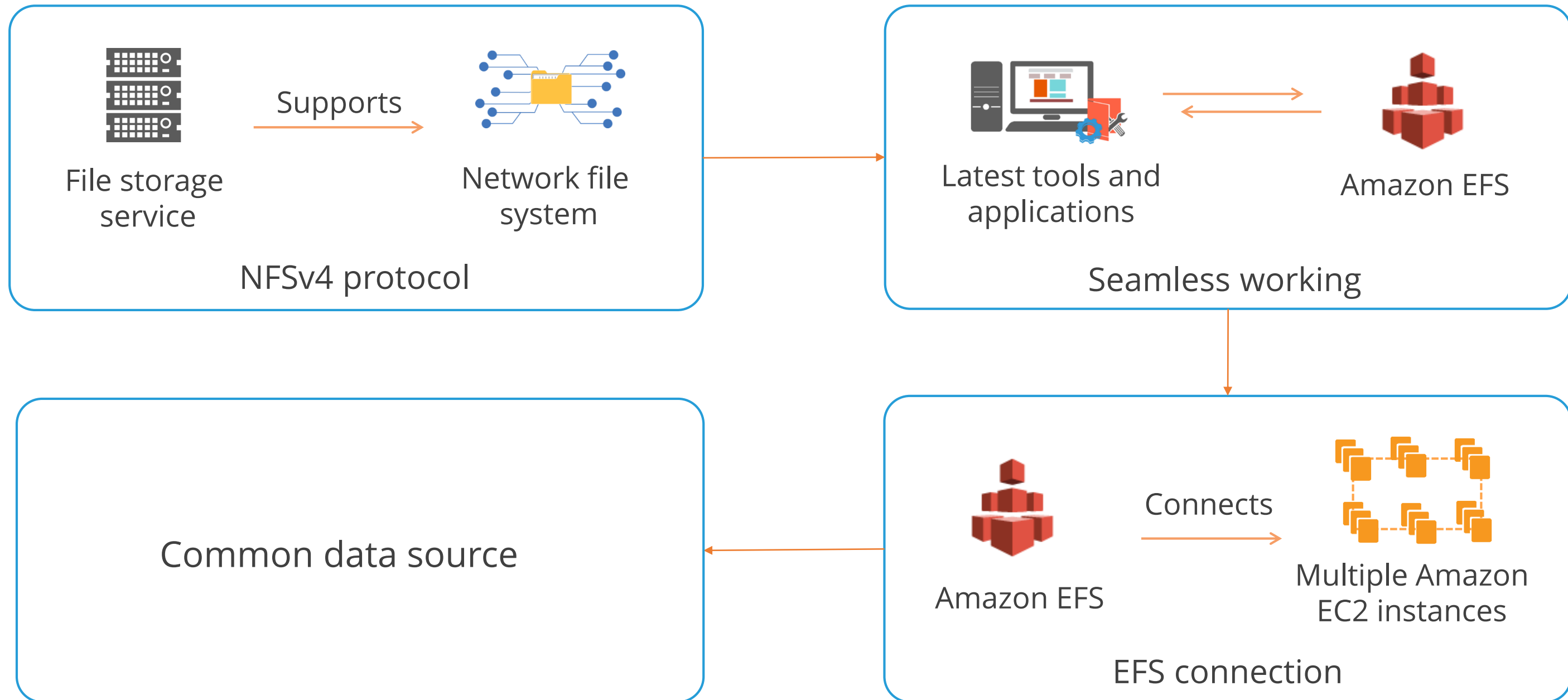


Amazon Elastic File System

The system is said to be elastic, as it automatically maintains storage whenever you create or delete a file.

Amazon EFS Usage

The Amazon EFS service enables storing Amazon EC2 instances.



Amazon EFS Benefits

Amazon EFS helps you to be charged only for your data usage or storage.



Seek solutions to manage content repositories



Maintain multiple development and test environments



Scale performance of Big Data applications



Manage users accessing data and shared datasets from a remote location

Amazon Data Storage Offers

Amazon Simple Storage Service (Amazon S3)

Amazon CloudFront

Amazon Elastic File System (Amazon EFS)

Amazon Glacier

Amazon Storage Gateway

Amazon Import/Export

Amazon Glacier

An economical storage solution to store data that would remain forever, but, rarely accessed.



Ideal choice for data backup and archiving



Provides data security of the highest level



Offers flexibility in storing and retrieving data



AWS bills you only for the used data or storage, and current least price for storing data in Amazon Glacier is \$0.007 per gigabyte per month.

Amazon Glacier Features

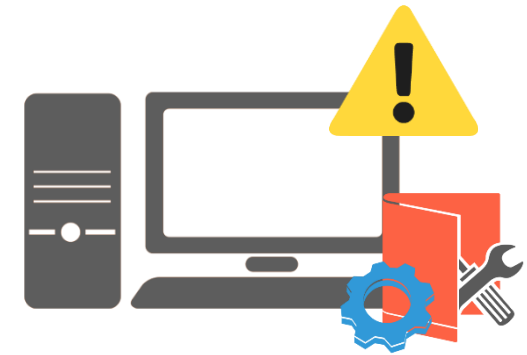
Maintaining historical data can be difficult as it adds to the administrative liability of managing and storing huge amounts of data.



Capacity planning



Hardware provisioning



Detecting and repairing hardware failure

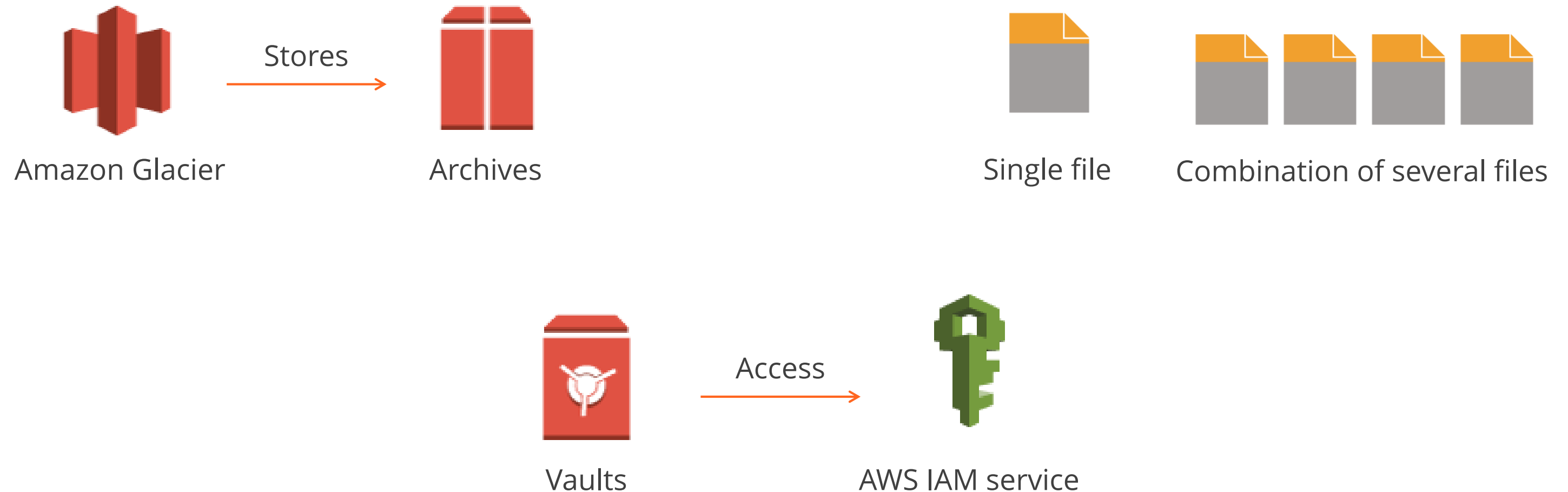


Data replication



Hardware migrations

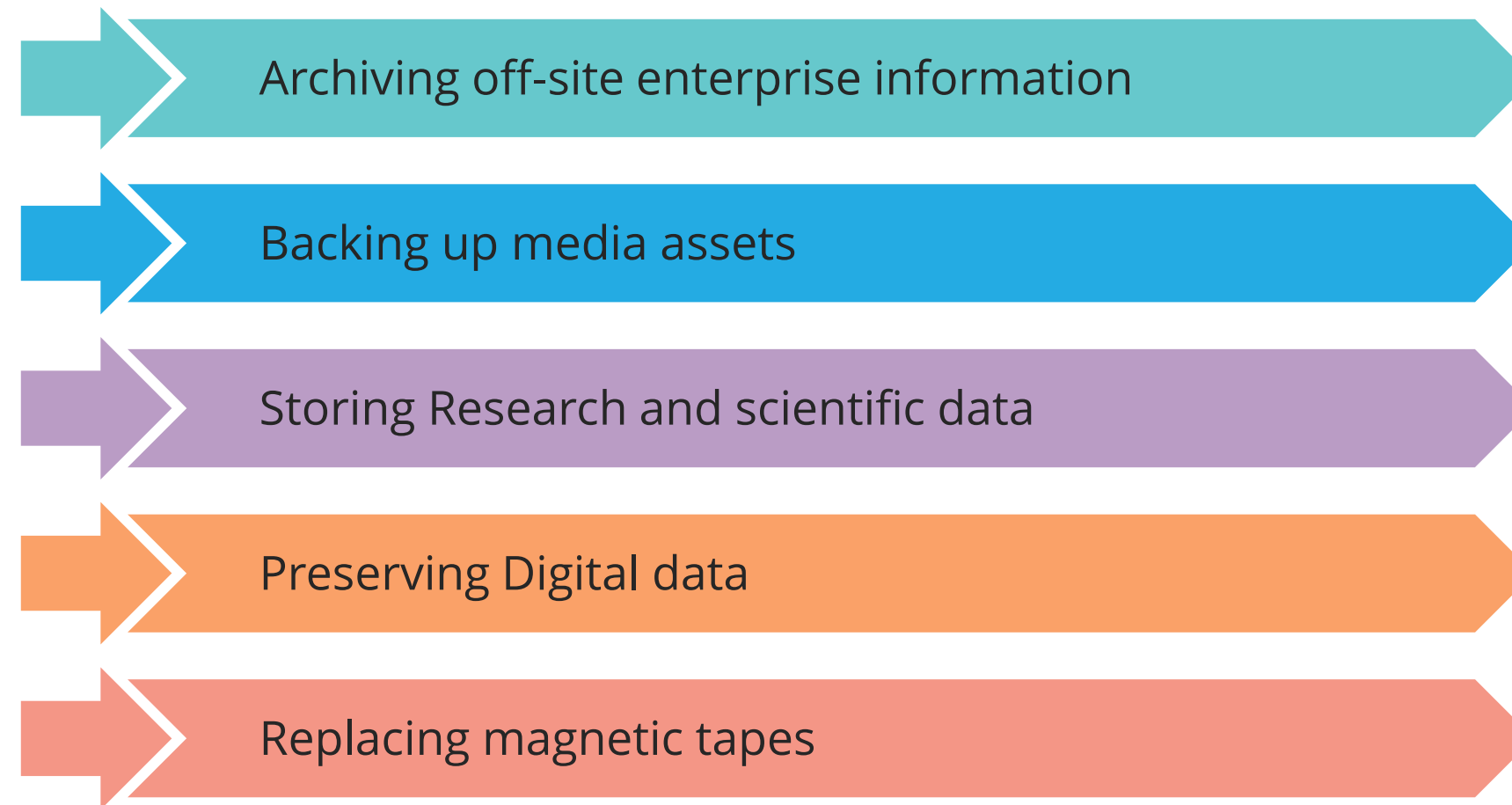
Amazon Glacier–Data Storage



Amazon Glacier stores data in transit via SSL, and uses 256-bit advanced encryption system.

Types of Data

Amazon Glacier support the following use cases:



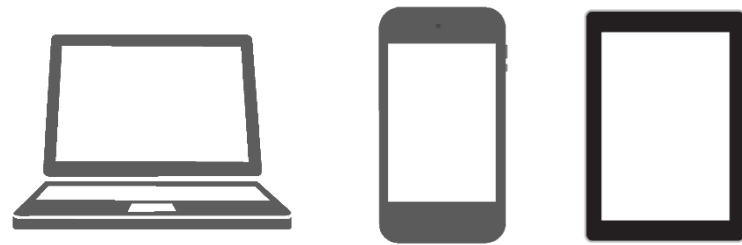
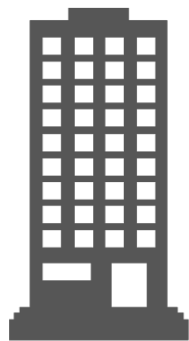
Durability and Availability

The Amazon Glacier archives offer an average annual resilience of 99.999999999 percent.

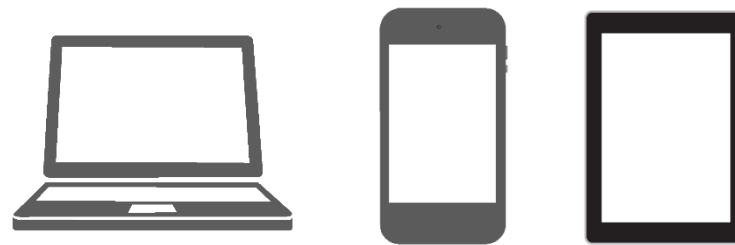
The archiving service maintains this resilience by continuously utilizing several facilities and devices within each facility to store the data.

This task continues till the service returns SUCCESS on uploading archives

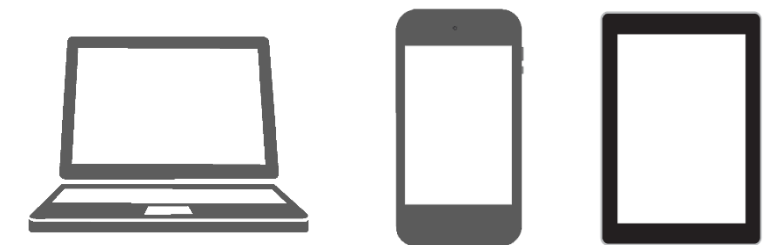
Facility 1



Facility 2



Facility 3





Knowledge Check

KNOWLEDGE
CHECK
1

Amazon Elastic File System is said to be elastic as it automatically maintains storage whenever you _____ a file.

- a. create or delete
- b. organize or restore
- c. manage or maintain
- d. enable or disable



KNOWLEDGE
CHECK

1

Amazon Elastic File System is said to be elastic as it automatically maintains storage whenever you _____ a file.

- a. create or delete
- b. organize or restore
- c. manage or maintain
- d. enable or disable



The correct answer is **a.**

Explanation: Amazon Elastic File System is said to be elastic as it automatically maintains storage whenever you create or delete a file. It enables you to create and set up file storage to quickly and easily access files.

KNOWLEDGE
CHECK
2

Amazon Glacier is ideal for ____.

- a. backup and archiving
- b. accessing data and shared data
- c. regular and frequently used data
- d. transfer and requests



KNOWLEDGE
CHECK

2

Amazon Glacier is ideal for ____.

- a. backup and archiving
- b. accessing data and shared data
- c. regular and frequently used data
- d. transfer and requests



The correct answer is **a.**

Explanation: Amazon Glacier is an ideal choice for data backup and archiving; provides data security of the highest level, and offers flexibility in both storing and retrieving data.

Amazon Data Storage Offers

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Amazon Import/Export

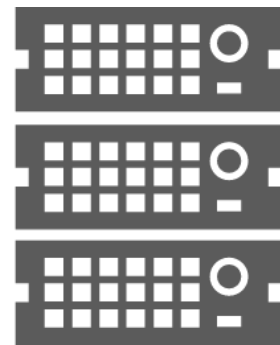
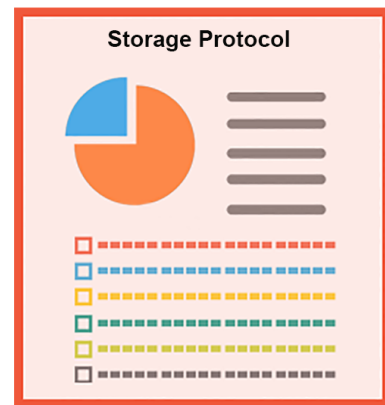
AWS Storage Gateway



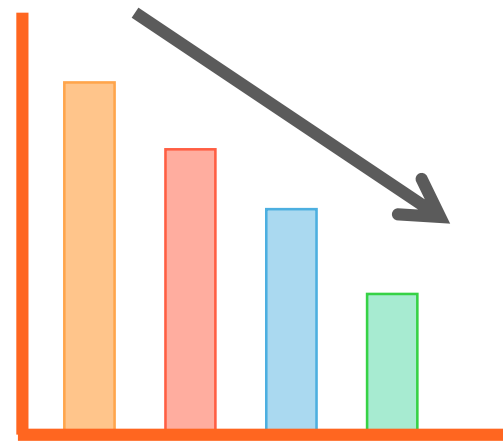
AWS Storage Gateway

AWS Storage Gateway is a scalable, and an economical amalgamation of your office IT and AWS storage infrastructure.

This amalgamation offers:



Storage protocols work in harmony with your current applications



Minimizes latency, or the gap between request and response time

Amazon S3



Amazon Glacier



Stores data in an encrypted form in Amazon S3, or Amazon Glacier

AWS Storage Gateway

The AWS Storage Gateway service is an ideal choice to:



Back up applications in an encrypted form



Plan for disaster recovery by creating a mirror of entire production environment



Share files within the corporate environment

AWS Storage Gateway Configurations

The AWS Storage Gateway service is an ideal choice to do the following:



Back up applications in an encrypted form



Plan for disaster recovery by creating a mirror of your entire production environment



Share files within the corporate environment

There are three configurations that the AWS Storage Gateway supports:

- Gateway-Cached Volumes
- Gateway-Stored Volumes
- Gateway-Virtual Tape Library

Amazon Data Storage Offers

Amazon Simple Storage Service (Amazon S3)

Amazon CloudFront

Amazon Elastic File System (Amazon EFS)

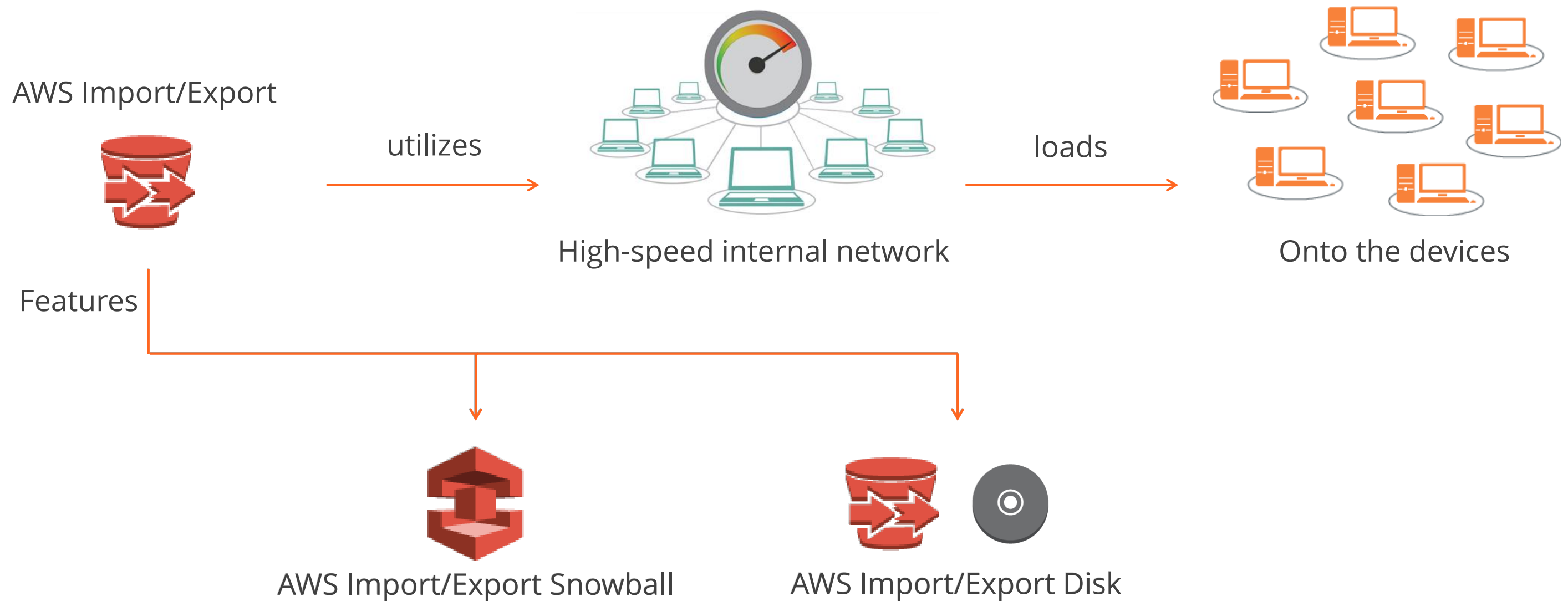
Amazon Glacier

Amazon Storage Gateway

Amazon Import/Export

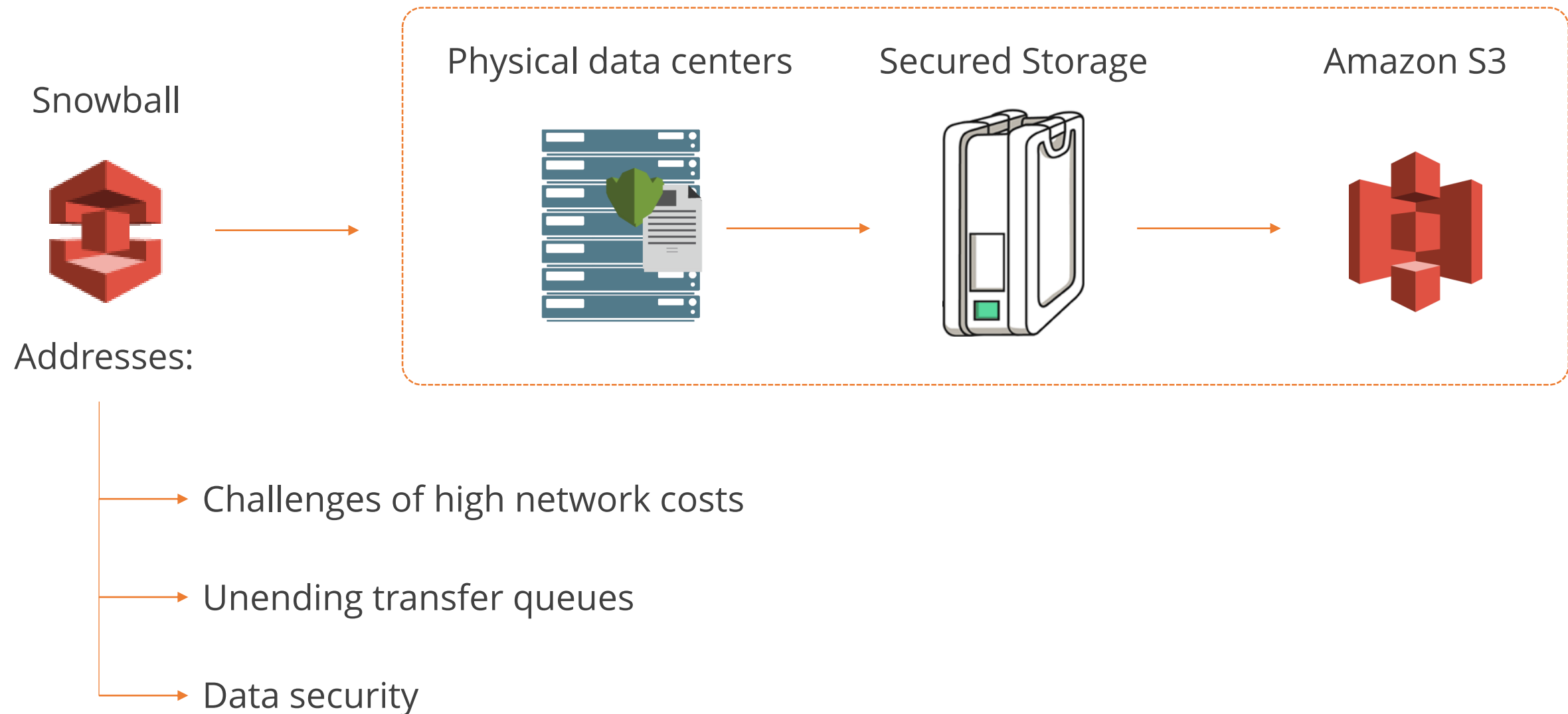
AWS Import/Export

The AWS Import/Export service allows easy transfer of considerable volumes of data from and to AWS without using the Internet, but physical storage devices.



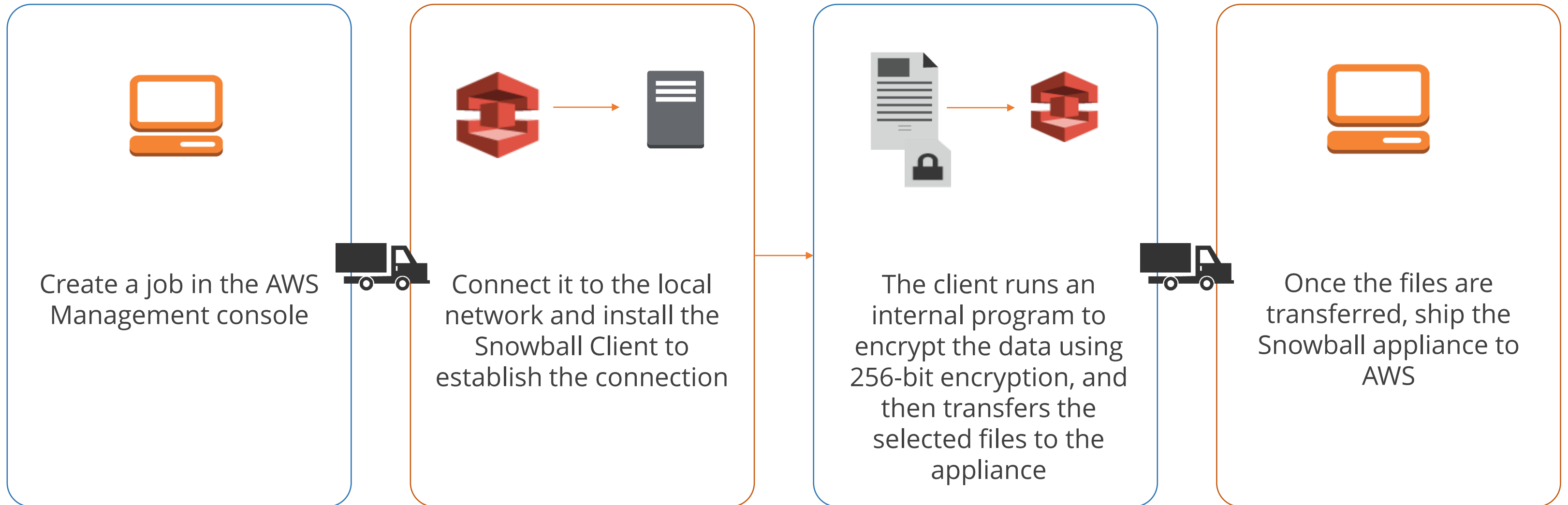
Snowball

Snowball is a cost-effective data transfer solution. A single Snowball is capable of transferring up to 50 terabytes of data.



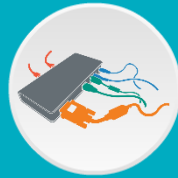
Snowball-Steps

Following are the steps to use Snowball:



Snowball-Uses

Snowball becomes your ideal choice when:



Expensive network infrastructure upgrades are beyond your budget or capacity



Huge backlog of data

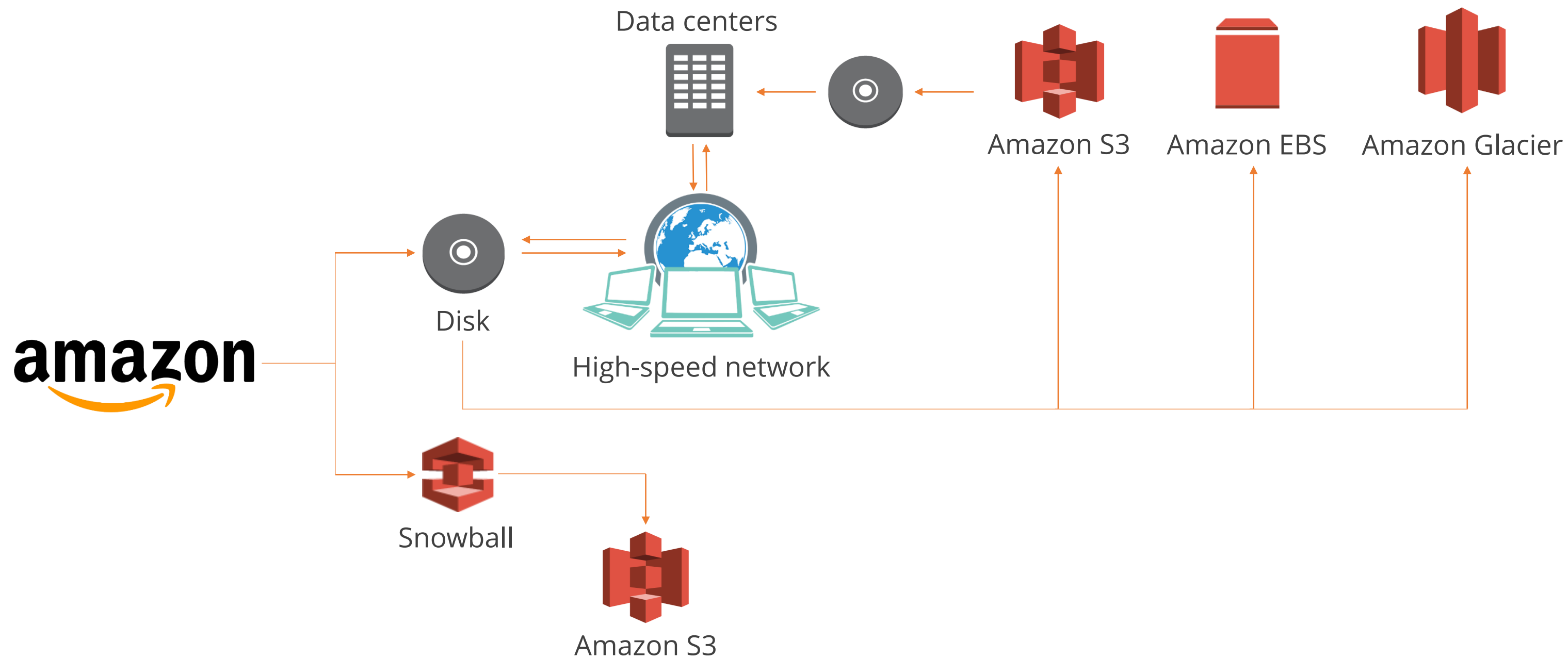


High-speed Internet connection not available



According to AWS, if the estimated time to transfer a certain amount of data using a high-speed connection is approximately one week, then you should opt for Snowball.

AWS Import/Export Disk





Knowledge Check

KNOWLEDGE
CHECK

1

The configuration that the Storage Gateway does not support is _____.

- a. Gateway-Cached Volumes
- b. Gateway-Stored Volumes
- c. the Gateway-Application Volume
- d. the Gateway-Virtual Tape Library



KNOWLEDGE
CHECK

1

The configuration that the Storage Gateway does not support is _____.

- a. Gateway-Cached Volumes
- b. Gateway-Stored Volumes
- c. the Gateway-Application Volume
- d. the Gateway-Virtual Tape Library



The correct answer is **c.**

Explanation: The three configurations that the AWS Storage Gateway supports are Gateway-Cached Volumes, Gateway-Stored Volumes, and the Gateway-Virtual Tape Library.

KNOWLEDGE
CHECK
2

Disk service enables transfer of data from and to your on-premises data centers using _____.

- a. Amazon S3
- b. Amazon Glacier
- c. Amazon CloudFront
- d. Amazon's internal high-speed network



KNOWLEDGE
CHECK

Disk service enables transfer of data from and to your on-premises data centers using ____.

- a. Amazon S3
- b. Amazon Glacier
- c. Amazon CloudFront
- d. Amazon's internal high-speed network



The correct answer is **d.**

Explanation: Disk service enables transfer of data from and to your on-premises data centers using Amazon's internal high-speed network. It is an ideal choice to transfer small amounts of data.

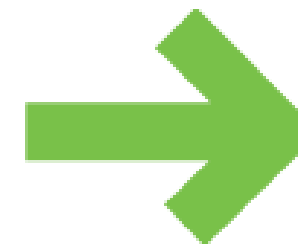
Elastic Block Storage of AWS

Elastic Block Storage

Amazon EC2 Instance Storage is an ephemeral storage offering instance data storing.



Storage for temporary use



Content is lost when the System is rebooted



EBS is used mainly in stateless web hosts, transcoding, caching, and High Performance Computing, or HPC.

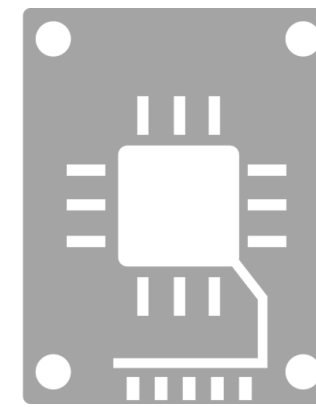
Two types of EBS constructions

Magnetic storage



- A slower, older Elastic Block Storage
- Provides up to 150 Input - Output Operations Per Second (IOPS)

SSD construction



General Purpose
IOPS

Provisioned
IOPS

Two types of SSD constructions

General Purpose IOPS

- Possesses the capability to provide three IOPS per GB of provisioned storage.
- Is used for small websites. It is also used for small and medium databases.

Provisioned IOPS

- Enables the user to specify the IOPS as per their requirement.
- Is used for applications and databases where there is a significant amount of traffic.

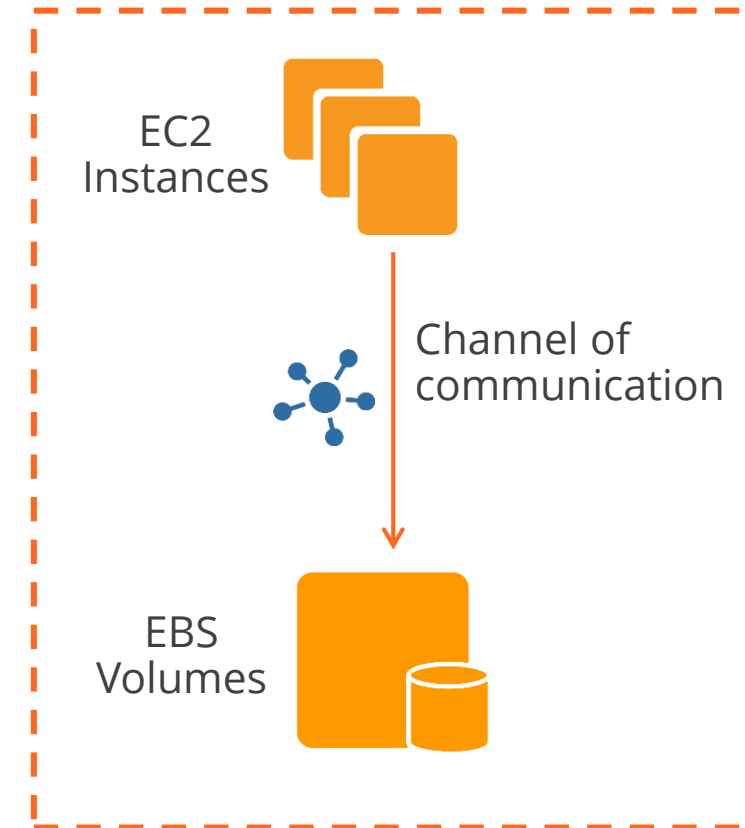
Provisioned IOPS and EBS Volume



Provisioned IOPS



EBS Optimized EC2 instances

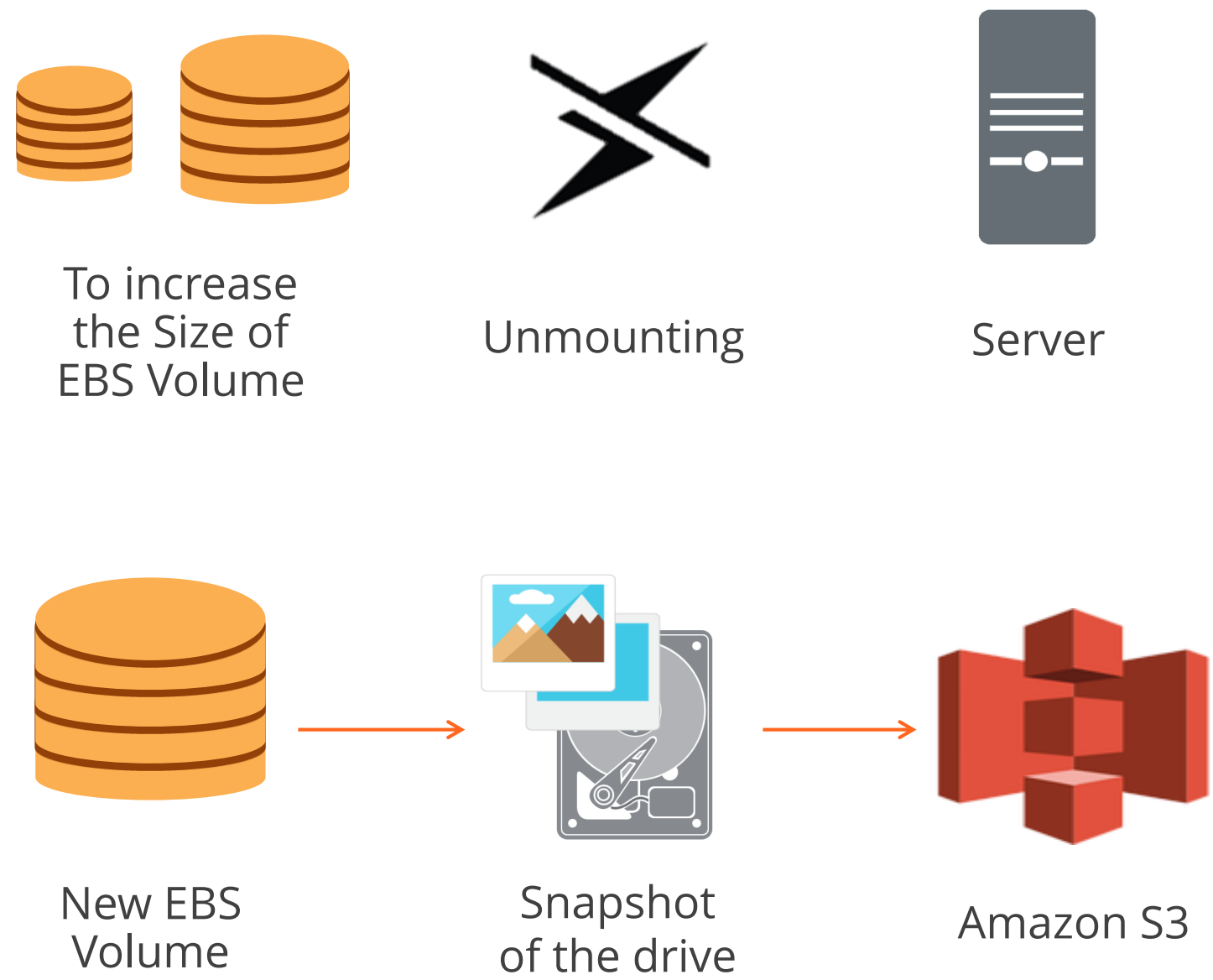


Same Availability Zone



EBS provides the option to increase the volume or storage size at a later stage, however, decreasing the size is ruled out.

EBS Volume Size and Snapshot





Knowledge Check

KNOWLEDGE
CHECK
1

EBS is used mainly in _____.

- a. transcoding
- b. encoding
- c. networking
- d. applications



KNOWLEDGE
CHECK

EBS is used mainly in _____.

- a. transcoding
- b. encoding
- c. networking
- d. applications



The correct answer is **a.**

Explanation: Ephemeral refers to the fact that the storage is for temporary usage and will lose its content when the system is rebooted. EBS is used mainly in stateless web hosts, transcoding, caching, and High Performance Computing (HPC).

KNOWLEDGE
CHECK
2

The Deleted stage enables you to use the _____.

- a. DeleteDrive
- b. Deletelifecycle
- c. DeleteSnapshot
- d. DeleteVolume



KNOWLEDGE
CHECK

The Deleted stage enables you to use the ____.

- a. DeleteDrive
- b. Deletelifecycle
- c. DeleteSnapshot
- d. DeleteVolume



The correct answer is **d.**

Explanation: The Deleted stage enables you to use the DeleteVolume function and delete the detached volume. This is the last stage of EBS volume lifecycle and marks the end.



QUIZ

Magnetic storage is persistent and is a slower, older _____.

- a. Elastic File System
- b. Simple Storage
- c. Elastic Block Storage
- d. Amazon Glazier



QUIZ

Magnetic storage is persistent and is a slower, older_____.

- a. Elastic File System
- b. Simple Storage
- c. Elastic Block Storage
- d. Amazon Glazier



The correct answer is **c.**

Explanation: Magnetic storage is persistent and is a slower, older Elastic Block Storage. It provides up to 150 Input Output Operations Per Second (IOPS).

QUIZ 2

Why is the retrieval time for stored data in Glacier much longer when compared to other options is AWS?

- a. Amazon Glacier is low in memory.
- b. Amazon Glacier is used to store archived data.
- c. Amazon Glacier is used to store large amounts of data.
- d. Amazon Glacier is used to store selective data.



QUIZ 2

Why is the retrieval time for stored data in Glacier much longer when compared to other options is AWS?

- a. Amazon Glacier is low in memory.
- b. Amazon Glacier is used to store archived data.
- c. Amazon Glacier is used to store large amounts of data.
- d. Amazon Glacier is used to store selective data.



The correct answer is **b.**

Explanation: Amazon Glacier is used to store data for long periods of time. This data is stored in archives and is retrieved by performing particular job tasks, making the retrieval time in Glacier much longer.

QUIZ 3

The data in Virtual Tape Library is backed by _____.

- a. Amazon EC2 Instances
- b. Amazon S3
- c. Amazon Glacier
- d. a Network of Virtual Tapes



QUIZ 3

The data in Virtual Tape Library is backed by _____.

- a. Amazon EC2 Instances
- b. Amazon S3
- c. Amazon Glacier
- d. a Network of Virtual Tapes



The correct answer is **b.**

Explanation: The Gateway-VTL service uses Amazon S3 to backup the VTL data, and Amazon Glacier to backup data in VTS.

QUIZ 4

What device is used by AWS for import or export?

- a. Firewall
- b. Datacenter
- c. Snowball
- d. Internet connection



QUIZ 4

What device is used by AWS for import or export?

- a. Firewall
- b. Datacenter
- c. Snowball
- d. Internet connection



The correct answer is **c.**

Explanation: The device used by AWS in its current state is Snowball, a ruggedized device that can be shipped to Amazon with one's data. This helps to import and export data in and out of the Amazon S3 buckets, Amazon Glacier, or Amazon EBS.

QUIZ 5

Which of the following is an SSD option? *Select all that apply.*

- a. General Purpose IOPS
- b. EBS volume
- c. Simple Storage Service
- d. Provisioned IOPS



QUIZ 5

Which of the following is an SSD option? *Select all that apply.*

- a. General Purpose IOPS
- b. EBS volume
- c. Simple Storage Service
- d. Provisioned IOPS



The correct answer is **a and d.**

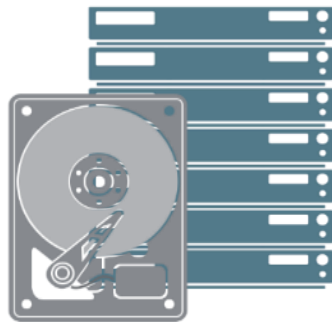
Explanation: General Purpose IOPS provides less storage and is used for small websites and databases. Provisioned IOPS is used for applications and databases where there is a significant amount of traffic.

Key Takeaways

Key Takeaways

Traditional Storage data centers have Direct Attached Storage, Network Attached Storage, and Storage Area Networks which differ in their performance, durability, and cost.

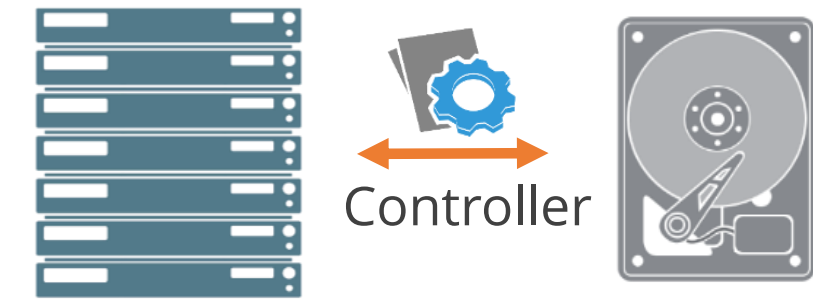
Direct Attached Storage (DAS)



Networked Attached Storage (NAS)



Storage Area Network (SAN)



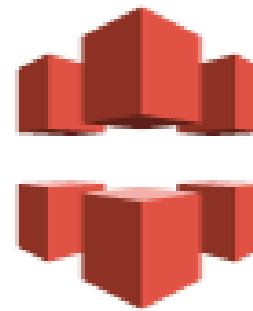
Key Takeaways

Amazon S3 provides a secure object storage to developers, Amazon CloudFront improves user experience by accessing the content of the website, and Amazon EFS enables the creation of file storage to easily access files.

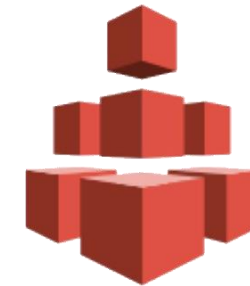


Safe and secure object storage

Amazon S3



Amazon CloudFront



Amazon Elastic File System

Key Takeaways

Amazon Glacier is a storage solution to store long-lived and irregularly accessed data, and AWS Storage Gateway is a service providing secure connection between organization's data centers and the cloud storage.



Ideal choice for data backup and archiving

Amazon Glacier

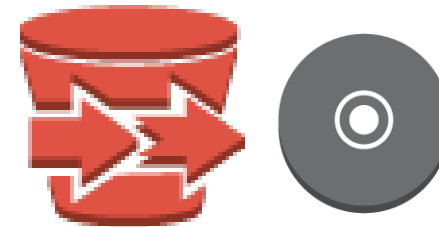


Key Takeaways

AWS Import/Export service enables easy transfer of large amounts of data into and out of AWS using physical storage devices, avoiding the Internet.



AWS Import/Export Snowball



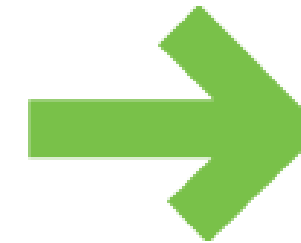
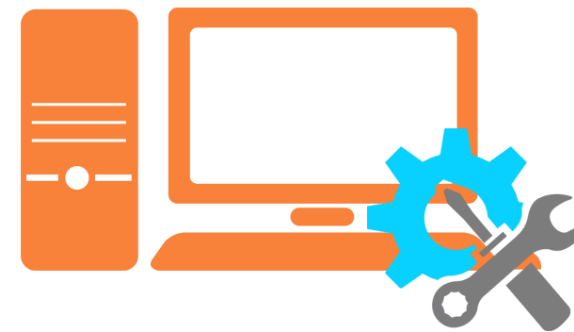
AWS Import/Export Disk

Key Takeaways

Ephemeral refers to the fact that the storage is for temporary usage and content will be lost upon system reboot.



Storage for temporary use



Content is lost when the System is rebooted

Key Takeaways



Traditional Storage data centers have Direct Attached Storage, Network Attached Storage, and Storage Area Networks which differ in their performance, durability, and cost.



Amazon S3 provides a secure object storage to developers, Amazon CloudFront improves user experience by accessing the content of the website, and Amazon EFS enables the creation of file storage to easily access files.



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This concludes 'Storage & Content Delivery.'

The next lesson is 'Compute Services and Networking.'