



Storage Services





Foreword

- As digital technologies continue to integrate into our daily lives, we start to find data stored everywhere, in traditional physical media, such as hard drives and thumb drives, or in increasingly popular cloud drives. To adapt to the exponential growth in data driven by the cloud era, cloud storage services are seeing widespread adoption by individuals and organizations alike.
- This lesson will introduce you to the different storage services Huawei Cloud provides, which can help you understand and take advantage of these powerful storage services.



Objectives

- Upon completion of this lesson, you will:
 - Learn how common Huawei Cloud storage services work and their use cases.
 - Understand the features of cloud storage and think about:
 - Management complexity and cost control
 - Choices between cloud computing and in-house technologies



Contents

- 1. Overview of Storage Services**
2. Object Storage Service (OBS)
3. Elastic Volume Service (EVS) and Local Disks
4. Scalable File Service (SFS)

Storage Services



Object Storage
Service
(OBS)



Elastic Volume
Service
(EVS)



Scalable File
Service
(SFS)



Dedicated Distributed
Storage Service
(DSS)



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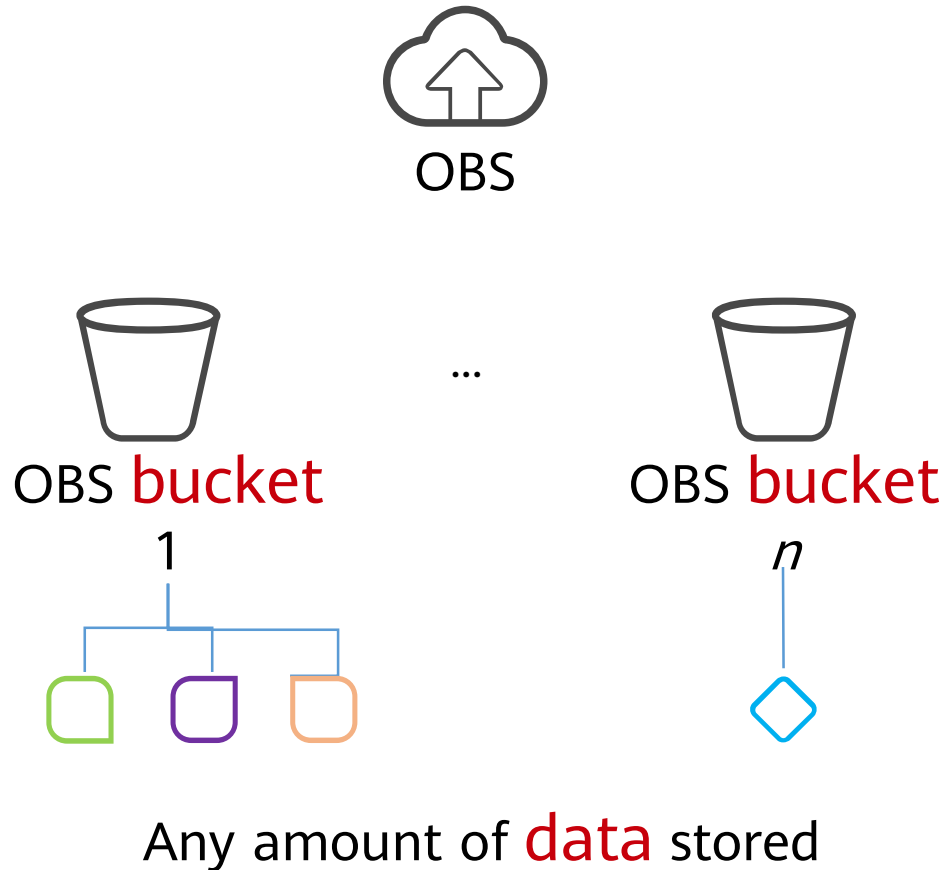
OBS Highlights



Object Storage Service
(OBS)

- ❑ Fully managed object storage
- ❑ Support for access over the Internet
- ❑ Unlimited storage (allowing for the upload of a single object up to 48 TB)
- ❑ Reliability of 99.999999999999%
- ❑ Event triggering capabilities
- ❑ Cost-effective solutions

OBS Terms



- You can access OBS using OBS Browser+, OBS command line tools, APIs, SDKs, or OBS Console.
- To store objects in OBS, you need to create a bucket first.
 - A bucket is a management unit of OBS.
- You can store any amount of data in OBS.
 - An object consists of data and metadata, which describes the data attributes.
 - An object is uniquely identified by an object name.

Object URL

Adding an object name to the access path of the bucket that stores this object **uniquely** identifies the object.

Each object has an access path (URL) that is accessible to the public.

The content in blue represents a bucket name.

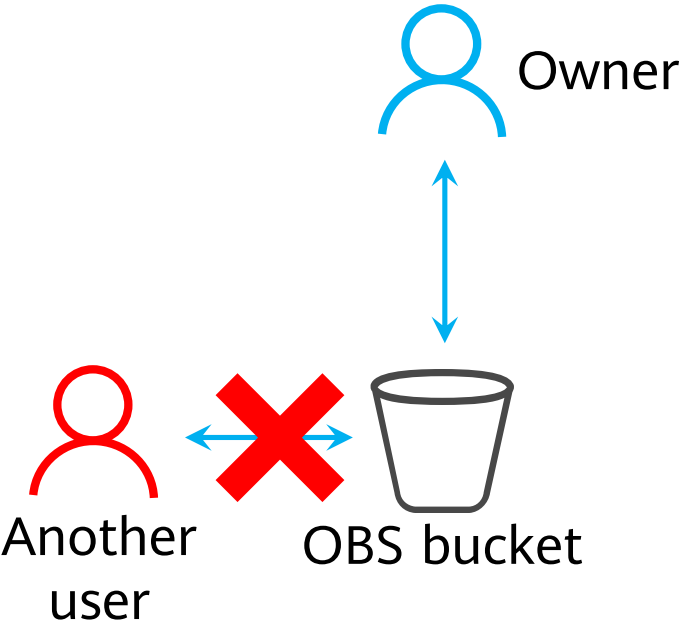
http://**bucket**.obs.cn-east-
3.myhuaweicloud.com/**mykey**/file.txt

The content in green represents an object name.

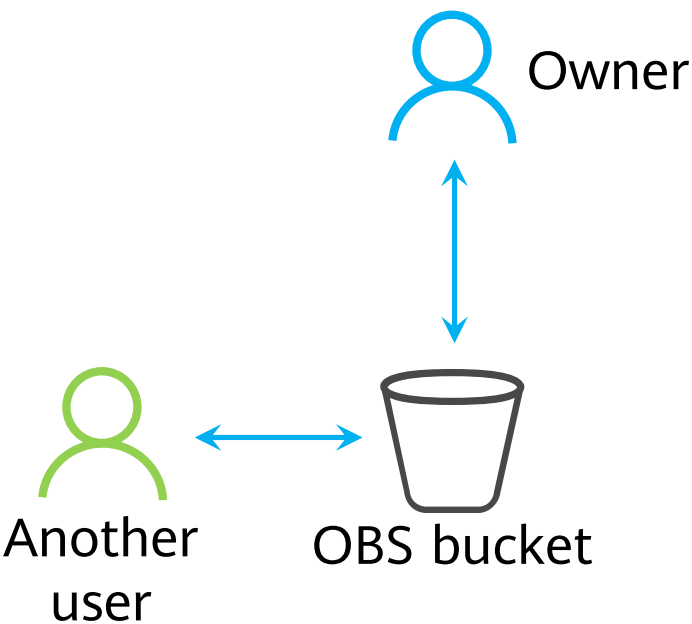
Give it a try. See what happens when you enter the URL in your browser?

OBS Permission Settings

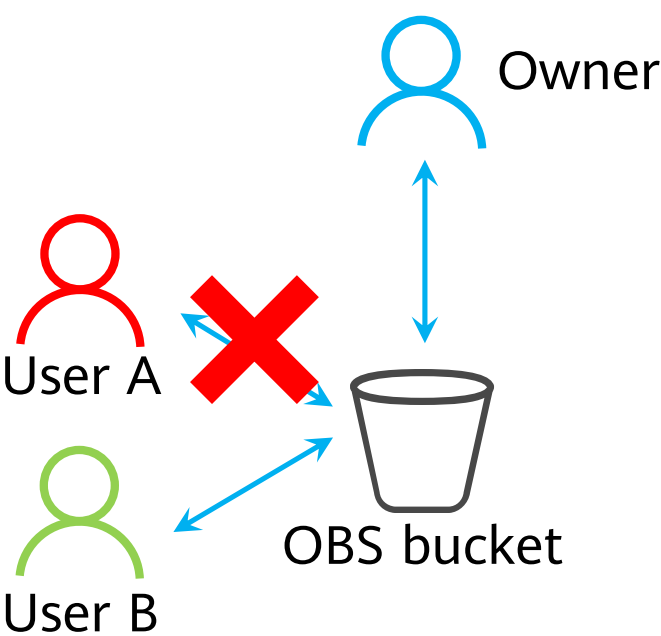
Default



Access control with ACLs

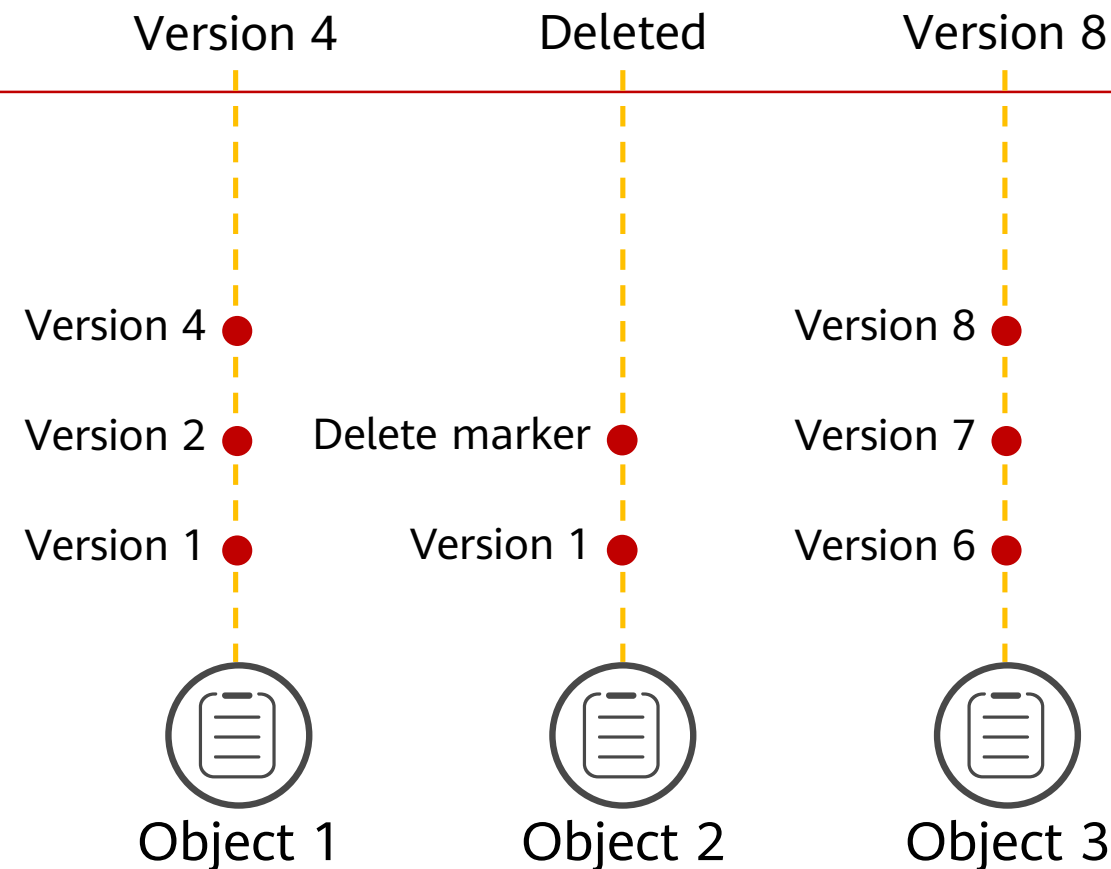


Access control with bucket policies



OBS Versioning

Object seen by users who access the object over an API



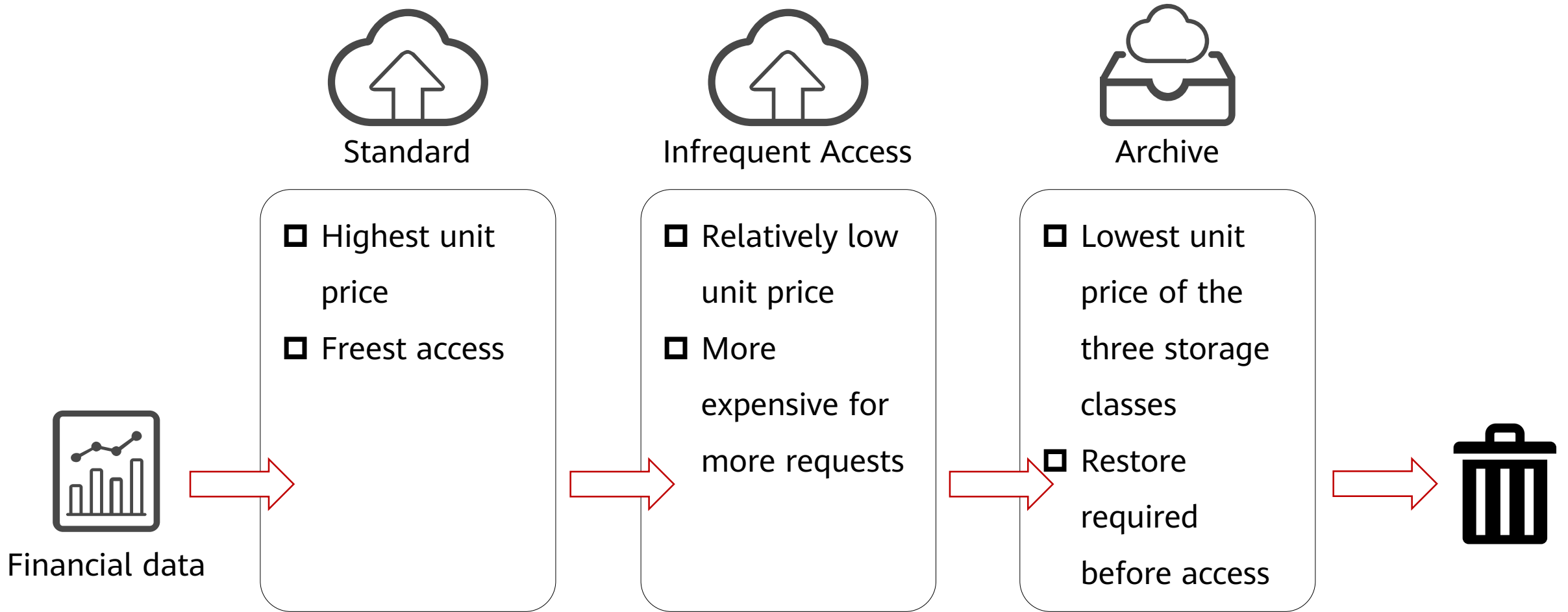
What If You Need to Archive Data?



OBS Archive storage

- Data that is seldom accessed but cannot be discarded
- High reliability required
- Restore needed before data access
- Less expensive than OBS Standard storage
- "Archive" is not the same as "backup".

Object Lifecycle Management (from Hot to Cold)



Typical Use Cases for OBS

- Data storage and backup
- Data distribution source
- Static website hosting
- Core storage for data lakes and data analytics

OBS Billing

- Decoupled storage and compute reduces storage costs.
- There are no minimum costs. No preset space is required and you only need to pay for what you use.
- Billable items include storage, traffic, and API calls.
 - Inbound traffic and the traffic transferred out to the same region are free.
 - There are discounts on traffic from OBS to CDN.
 - Unnecessary function calls result in waste.

Reference: <https://www.huaweicloud.com/intl/en-us/pricing.html>



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EVS Highlights

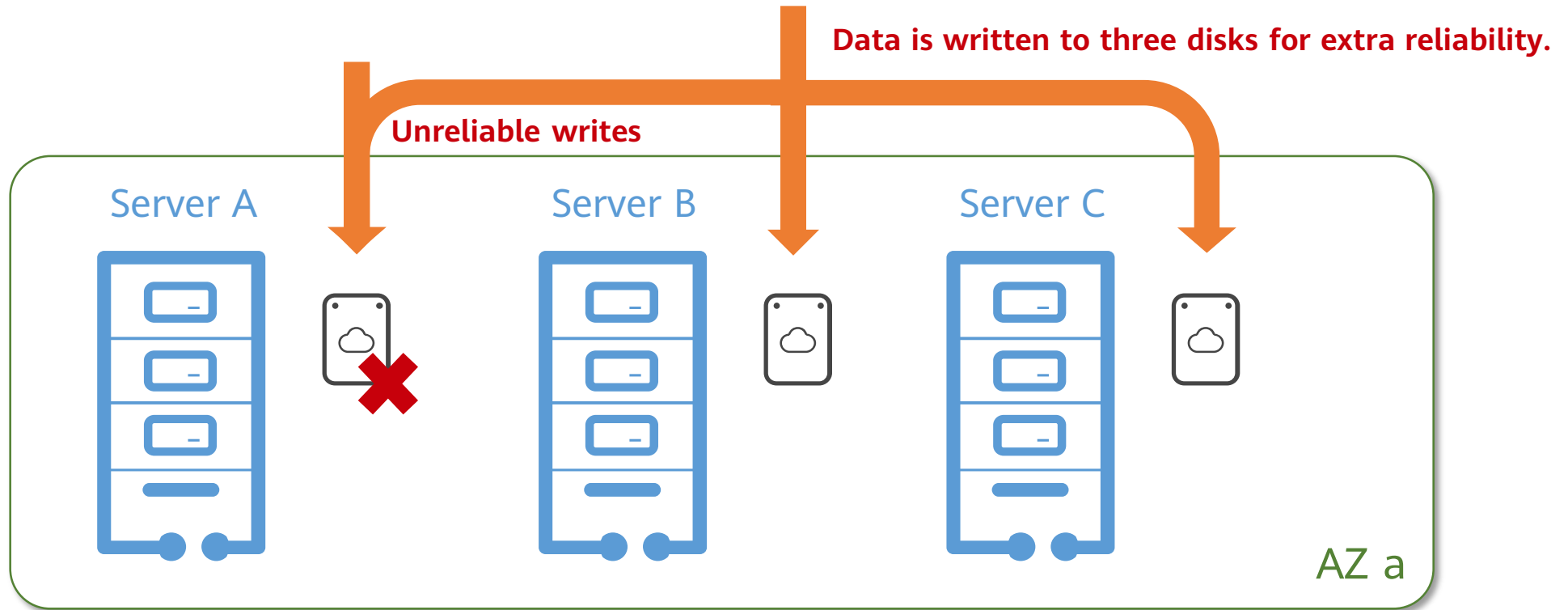


Elastic Volume
Service (EVS)

- ❑ A block storage service that provides disks to ECSs
- ❑ Three-copy redundancy in a single AZ and 99.99999999% durability
- ❑ Up to 32 TB for a single disk
- ❑ A variety of specifications, balancing both costs and performance
- ❑ Storage of the backup data to OBS

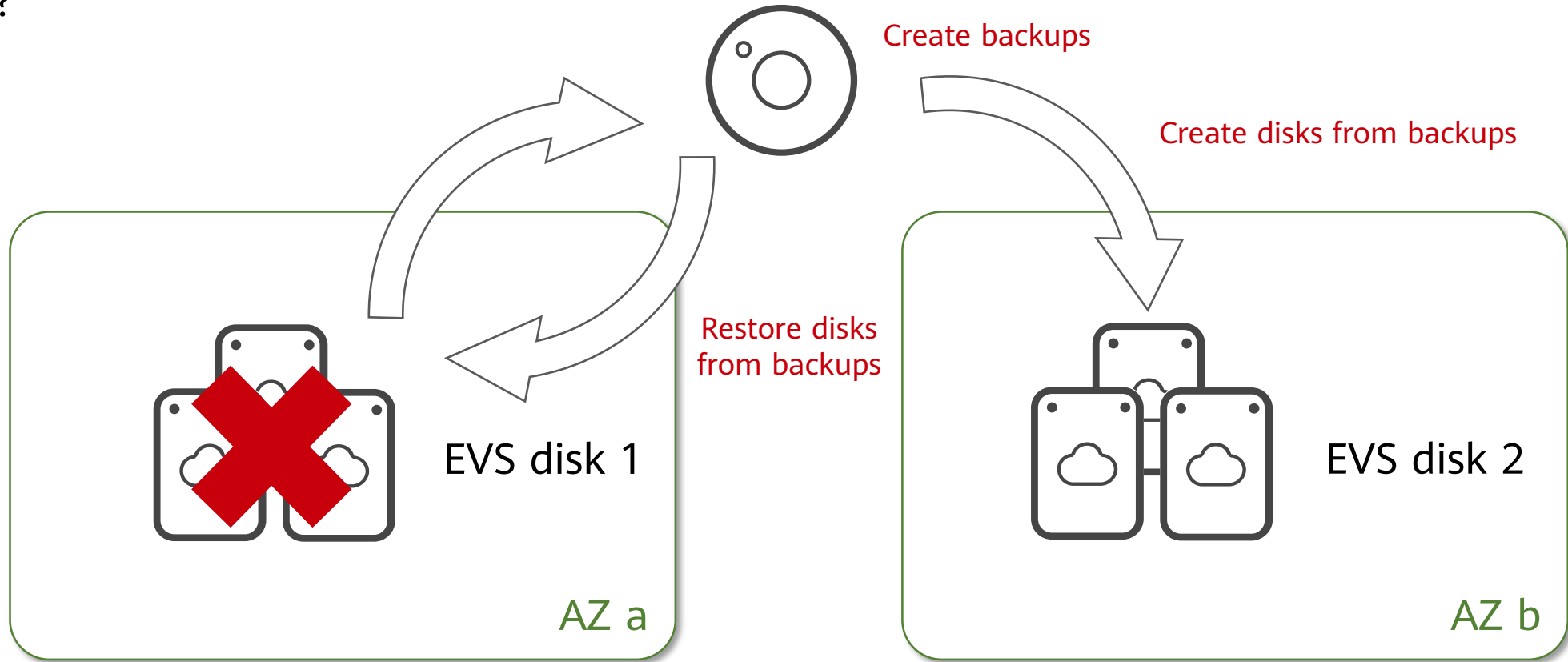
EVS High Reliability Design - Three-copy Redundancy

- How many disks are used to store your data?



EVS High Reliability Design - Backup

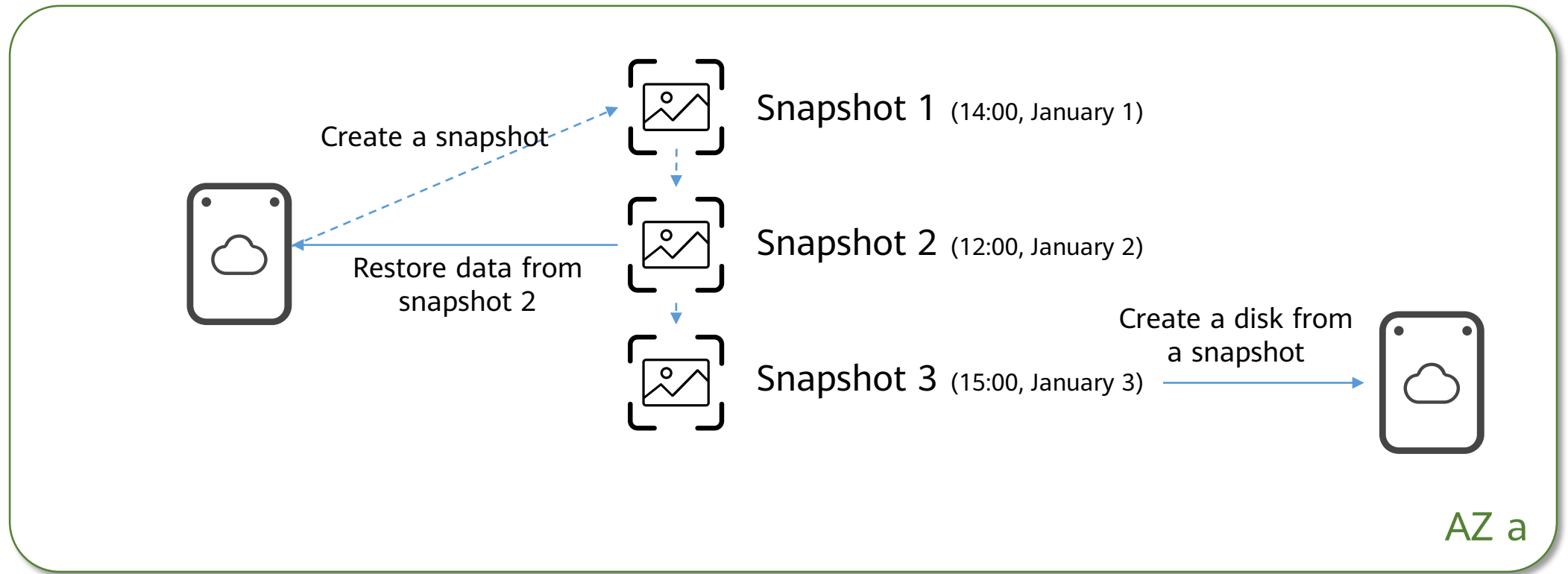
- How can you protect disk data from viruses, accidental deletions, or hardware and software faults?



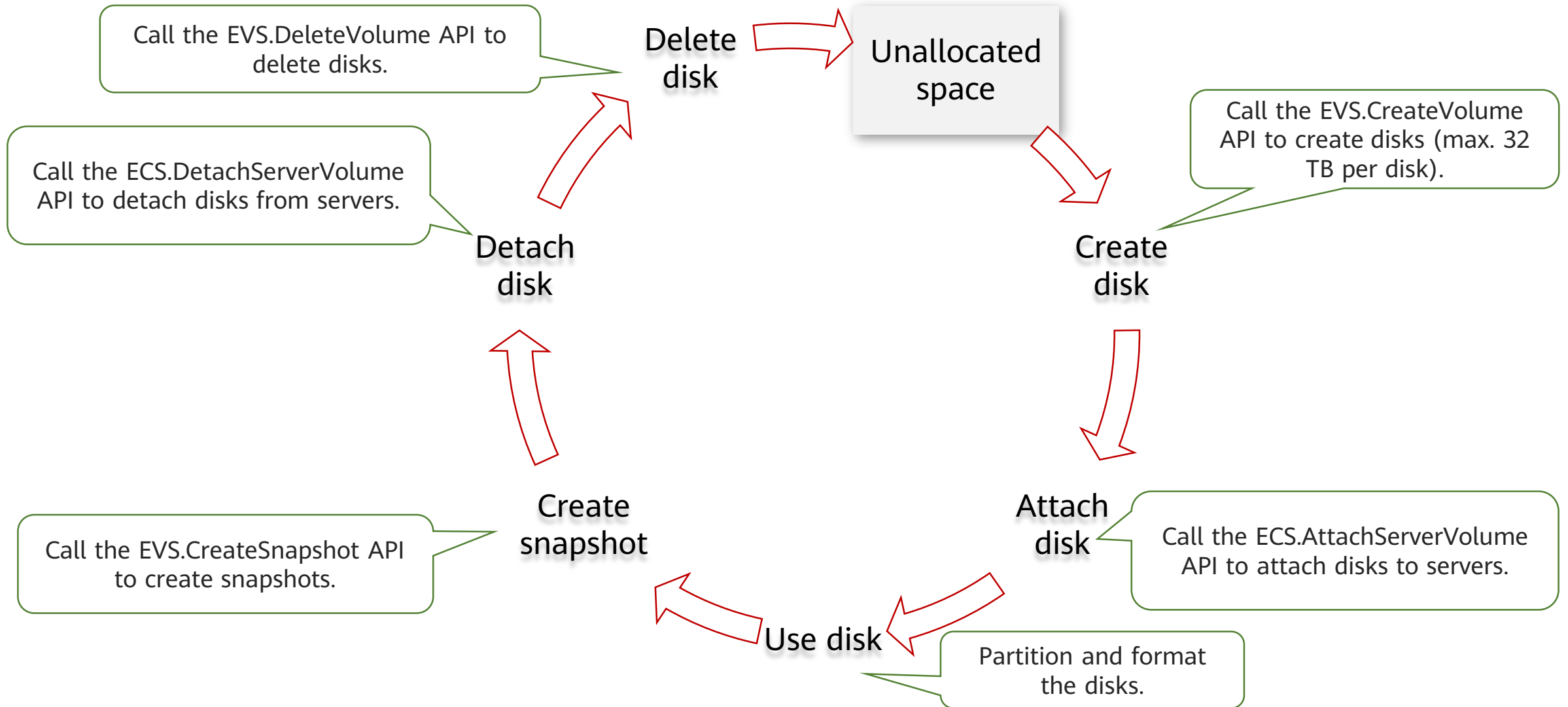
Three-copy redundancy can only be deployed in one AZ, not across AZs.

EVS High Reliability Design - Snapshot

- In addition to backups, how can you quickly restore data lost due to misoperations, viruses, or hacker attacks?



EVS Disk Lifecycle



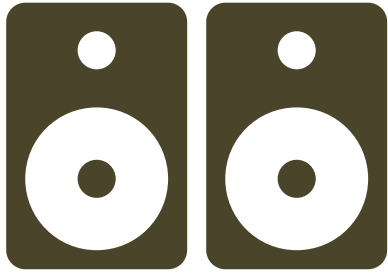
EVS Use Cases and Applicable Features

- System disks
 - High IOPS and low latency
- Databases
 - Persistent storage
- Applications running durable services
 - High data reliability
- Sensitive enterprise applications
 - EVS encryption

EVS Billing

- Two billing modes: yearly/monthly and pay-per-use
 - Yearly/Monthly subscriptions enjoy discounts.
- Pricing based on the allocated disk size.
 - Regardless of how much disk space is used (even 1 MB), the entire disk capacity is billed.
- Unit prices of disks vary depending on the region.

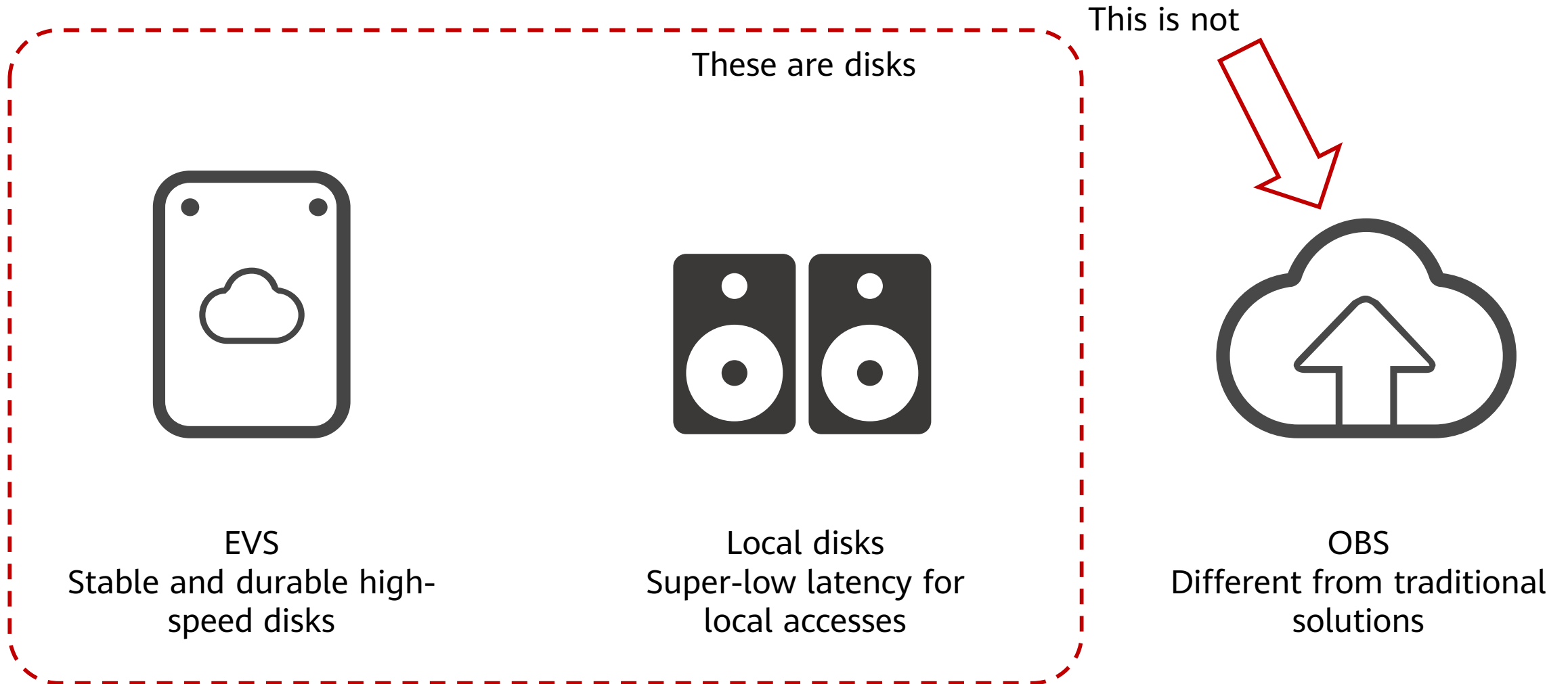
ECS Local Disk Highlights



ECS local disks

- ❑ Super low access latency
- ❑ Super high IOPS
- ❑ Available only for some types of instances, such as i3 and d6
- ❑ No extra fees after instances are purchased
- ❑ Data is lost if ECSs are stopped or crashed

Where to Store Data

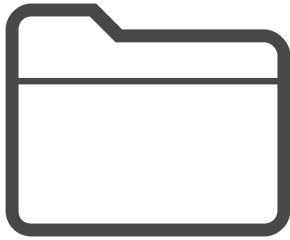




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SFS Highlights

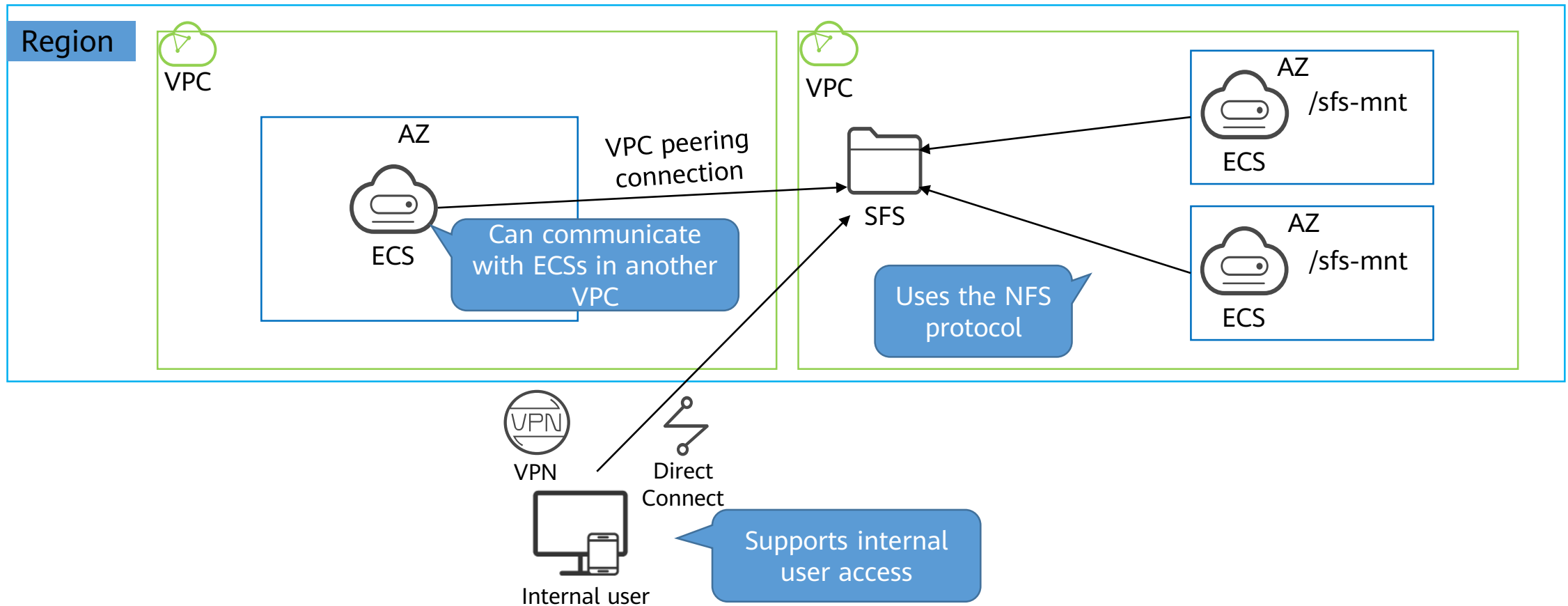


Scalable File Service (SFS)

- ❑ A shared file storage service
- ❑ Full NFS protocol support and partial CIFS protocol support
- ❑ Three-copy redundancy and 10 nines of durability
- ❑ Elastic scaling of file system capacity
- ❑ Linear performance scaling

SFS Network Management

- ECSs can only access a file system in the same VPC. When creating an SFS file system, make sure it is in the same VPC as the ECSs that will be accessing it.



Comparisons Between Storage Solutions

	EVS	Local Disk	OBS	SFS
Working Model	Block storage presented as disks		Object storage accessed via APIs	File storage mounted using network protocols
Reliability	Multiple copies in a single AZ, 9 nines of durability (99.99999999%)	No HA design. Data is lost if a server is stopped.	Multiple copies in multiple AZs, and 12 nines durability (99.9999999999%)	Multiple copies in multiple AZs, and 10 nines durability (99.99999999%)
Security	EVS encryption	Encryption in OS	OBS encryption	SFS encryption
Performance	Sub-millisecond latency and high bandwidth	Super-low latency for local accesses	10 ms latency, high concurrency, and high throughput	High bandwidth and linear performance increase
Storage space limit	Storage space is pre-allocated. One disk supports up to 32 TB.	Depends on the instance type	No limits on bucket quantity and storage space, and a maximum of 48 TB for a single object.	No limits on quantity and storage space, and the maximum capacity of a single file system varies depending on the file system type.
Costs	High. EVS disks must be used with servers.	Free. Disk cost is included in the instance cost.	Low. Different storage classes are available.	Relatively low. Different storage classes are available.
Internet access	No. EVS disks must be attached to servers for use.		Yes, if certain permissions are assigned.	No. A VPC network must be set up.
Application scenarios	Workloads run on traditional disks		Large-scale data storage, important data sources for big data, archive data storage, and data distribution on the Internet	High-performance computing (HPC), media processing, file sharing, content management, and web services



Section Summary

This section:

- Introduced Huawei Cloud storage services.
- Described the concepts and functions of OBS, EVS, local disks, and SFS.
- Described the features of OBS and EVS.
- Described the differences between storage services.

Quiz

Which of the following methods can be used to quickly restore lost data on an EVS disk? ()

- A. Backups
- B. Three-copy redundancy
- C. Snapshots
- D. Version management



Acronyms and Abbreviations

- ECS: Elastic Cloud Server
- EVS: Elastic Volume Service



Recommendations

- Huawei Cloud websites
 - Huawei Cloud: <https://www.huaweicloud.com/intl/en-us/>
 - Huawei Cloud Developer Institute: <https://edu.huaweicloud.com/intl/en-us/>



Huawei Cloud
Developer Institute

Thank You.

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