Cloud Storage Service – Object Storage Service

Foreword

- This course provides an overview about Object Storage Service (OBS) in HUAWEI CLOUD.

Objectives

- Upon completion of this course, you will:
  - Know what OBS is.
  - Understand basic concepts, functions, and application scenarios of OBS.
  - Know advantages and the charging standards of OBS.
  - Know how to use the basic functions.

Contents

Introduction to OBS

- What is OBS?

  Object Storage Service (OBS) is a stable, secure, efficient, and easy-to-use cloud storage service. It provides highly reliable storage capabilities at relatively low costs.

Product Advantages

- Stable

With reliability built into multiple levels of the architecture (such as equipment and data redundancy within an AZ, as well as cross-AZ data DR), OBS achieves up to 99.999999999% (11 nines) in data durability, and maintains an impressive 99.99% service continuity rate.

- Efficient

OBS schedules data in the most optimal way, and leverages transfer acceleration and big data optimization to deliver the best possible data access experience.

Object storage service

- Secure

OBS has passed the Trusted Cloud Service (TRUCS) certification. It secures your data with multiple protection mechanisms, including server-side encryption, URL validation, VPC-based network isolation, log auditing, and fine-grained permission control.

- Easy to use

OBS supports REST APIs, provides multi-language software development kits (SDKs), and is compatible with all mainstream client tools. Furthermore, OBS gives you the freedom to upload, download, and manage your data anytime, anywhere.

OBS Charging Standards (1/2)

- OBS provides two billing modes. You can prepay for yearly/monthly packages or pay per use. You are charged per use by default.

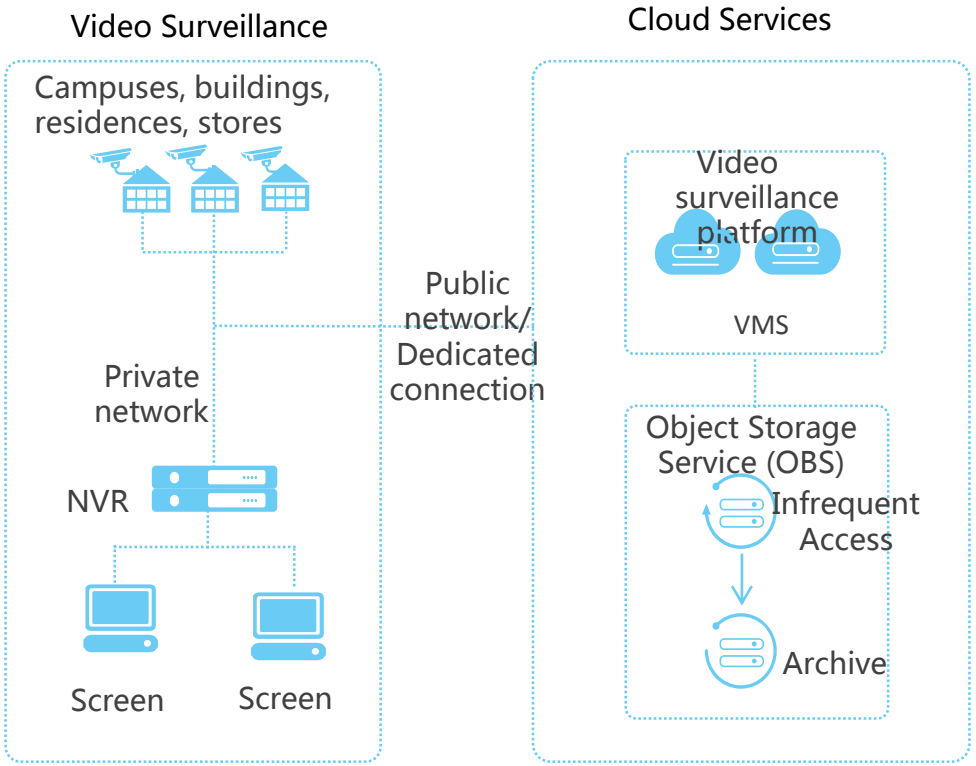
Billing Mode	Billing Item	Details
Pay per use	Storage capacity	Storage capacity per hour (GB) x hourly price of the corresponding storage class
	Request	Price per 10-thousand requests x Actual requests per hour/10,000 (rounded down)
	Traffic fee	• Inbound traffic over the Internet and intranet. Free of charge • Outbound traffic over the intranet. Free of charge • Outbound traffic over the Internet. Hourly traffic (GB) x Unit price per GB
	Data Restoration	Restored data volume (GB) x Unit Price per GB

OBS Charging Standards (2/2)

- OBS provides two billing modes. You can prepay for yearly/monthly packages or pay per use. You are charged per use by default.

Billing Mode	Billing Item	Details
Yearly/Monthly prepayment	Resource package OBS offers packages for multi-AZ storage, common storage, downstream traffic, and pull traffic.	• One-off payment and effective upon payment • Clear-up monthly • Renewal and unsubscription not supported • Multiple packages supported for one account • Within the validity period of a package, used resources are deducted from the package quota first. If the used resources exceed the package quota, the excessive part is charged at the pay-per-use rates.

OBS Application Scenario - Video Surveillance

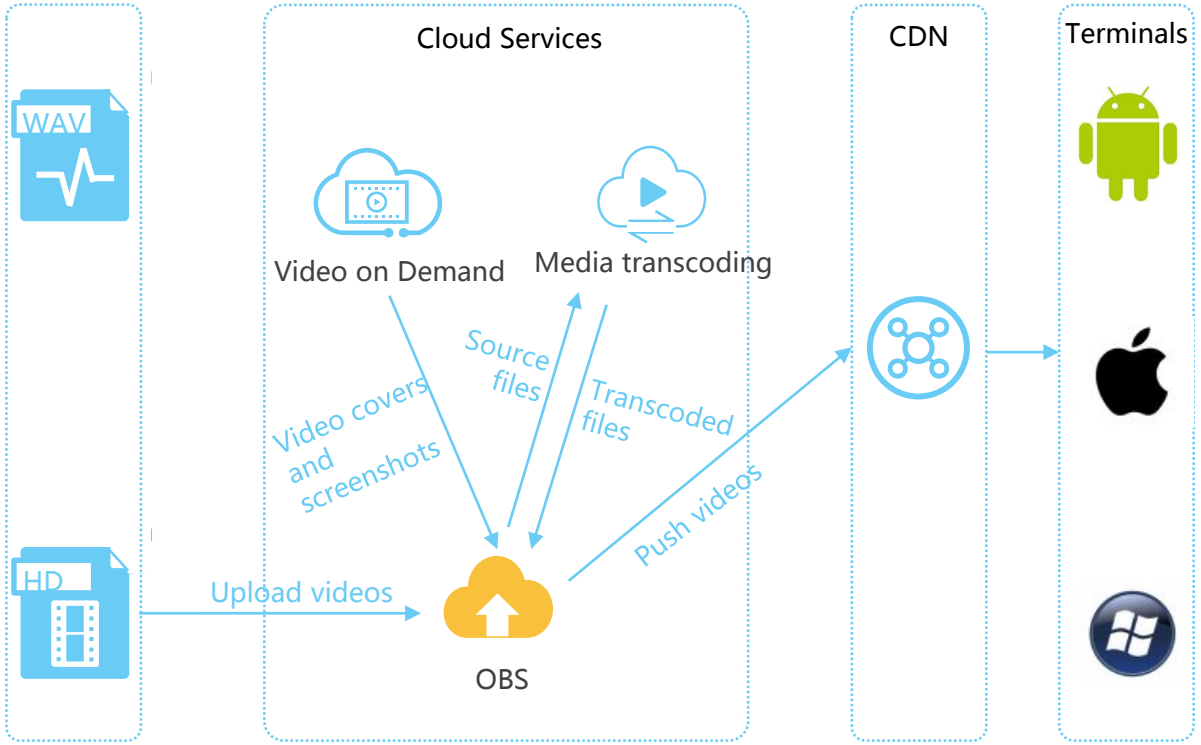


1 billion+ Camera links

50% ↓ Costs

- A single bucket can support a maximum of 1 billion cameras.
- A single bucket can store **100 billion** objects, with the capacity amounting to EB-level.
- One-channel video analysis can be done in **10** seconds; single-stream reaches the bandwidth performance of 300 MB/s; GPU computing efficiency increased by 50%.
- Fillp patent transmission acceleration is available.
- Storage price starts from ¥0.08/month per GB. You can pay as you go, without worries about depreciation and O&M, greatly reducing the costs.
- Multiple agencies can share their video networking resources, video storage resources, and video analysis application resources.
- Resources can be provisioned in minutes, and services can be flexibly deployed.

OBS Application Scenario - Video on Demand



Latency as low as 10 ms

- QAT acceleration (HTTPS); delay less than 10 ms; fluent online video playing

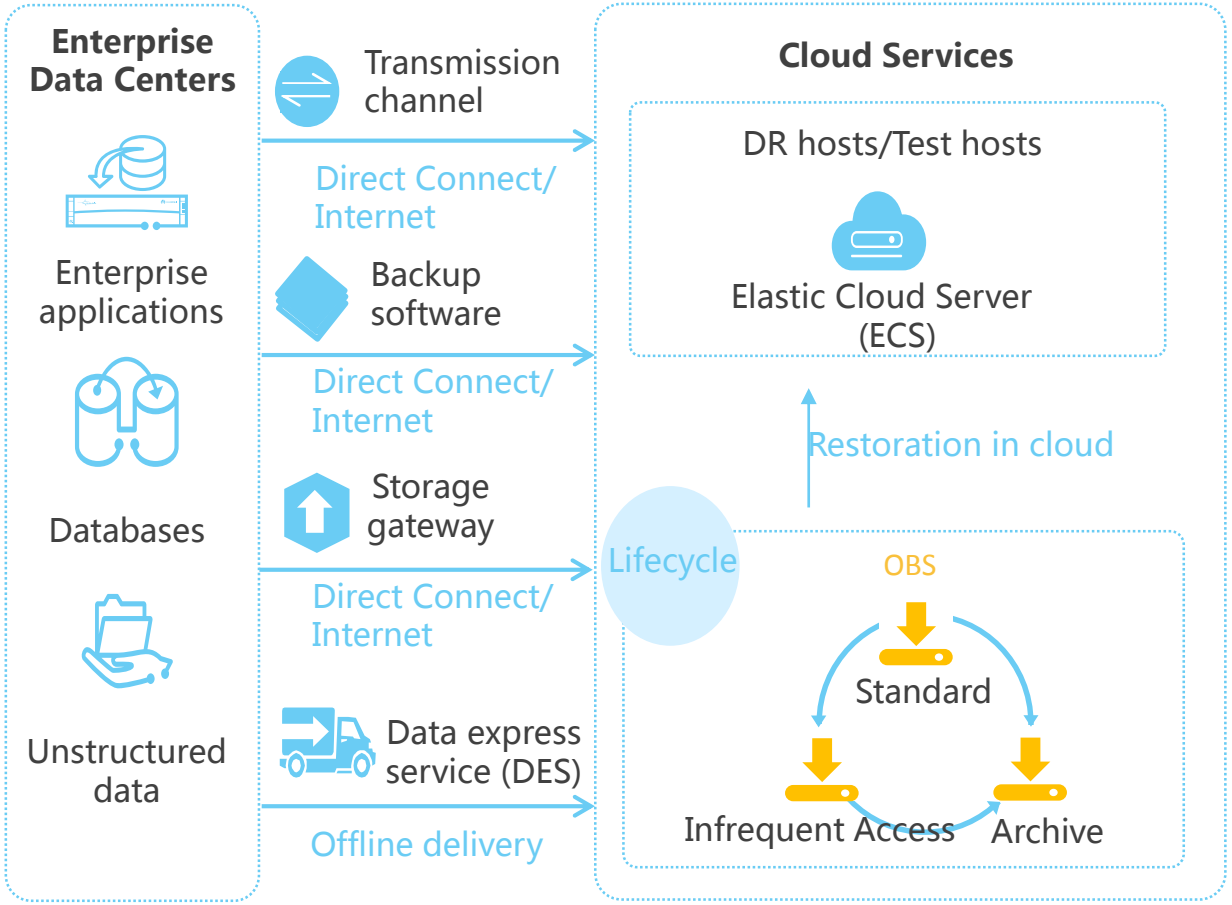
300 MB/s single-stream bandwidth

- Single-stream bandwidth reaches 300 MB/s.

High concurrency TPS

- 10-million TPS concurrency and 100-billion object storage per bucket (meeting the requirements of processing 3 million concurrent access requests out from 250 million mobile users)

OBS Application Scenario - Backup and Archiving



Secure and reliable

- Widely compatible, supporting backup of all mainstream OSs, applications, and databases; encrypted data transmission and storage

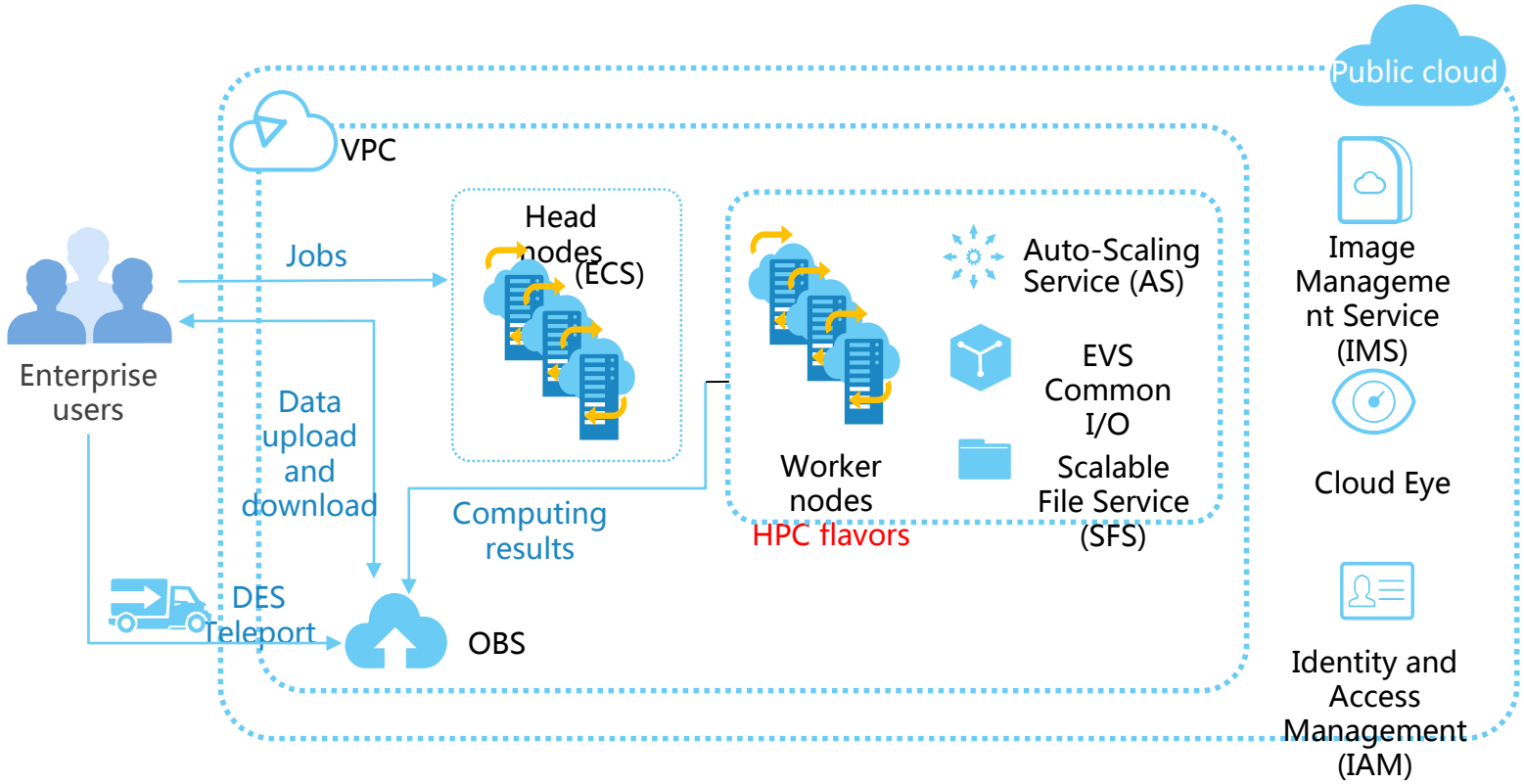
Economic and efficient

- Cloud resources are provisioned and charged on demand. The initial investment is reduced by 60%, and the construction period is shortened from months to days.

Easy to manage

- Public cloud computing, storage, and network services are at your request. No dedicated O&M is required.

OBS Application Scenario - High Performance Computing



Fast upload and download

- Up to 300 MB/s single-stream bandwidth, implementing quick online import of data
- Temporary authorization: Secure and convenient secondary distribution of data

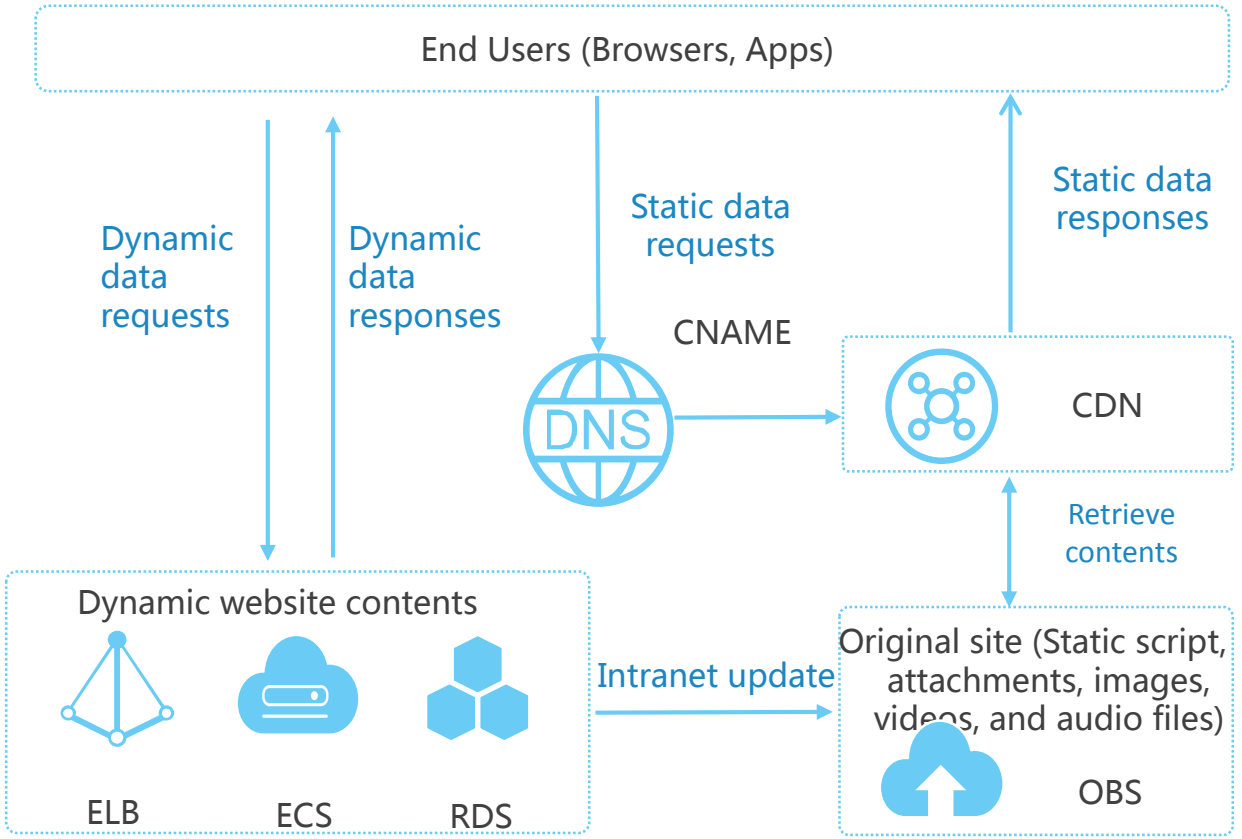
Large volume data import

- 120 TB data can be migrated to the cloud with the Teleport offline data transfer capabilities.

Archive storage price starts from ¥0.033/GB per month

- Source data and calculation results can be stored in the Archive storage, costing as low as ¥0.033/GB per month.

OBS Application Scenario - Mobile Internet



Scalable as needed

- Elastic resource scalability and flexible resource allocation
- Unlimited space for object storage

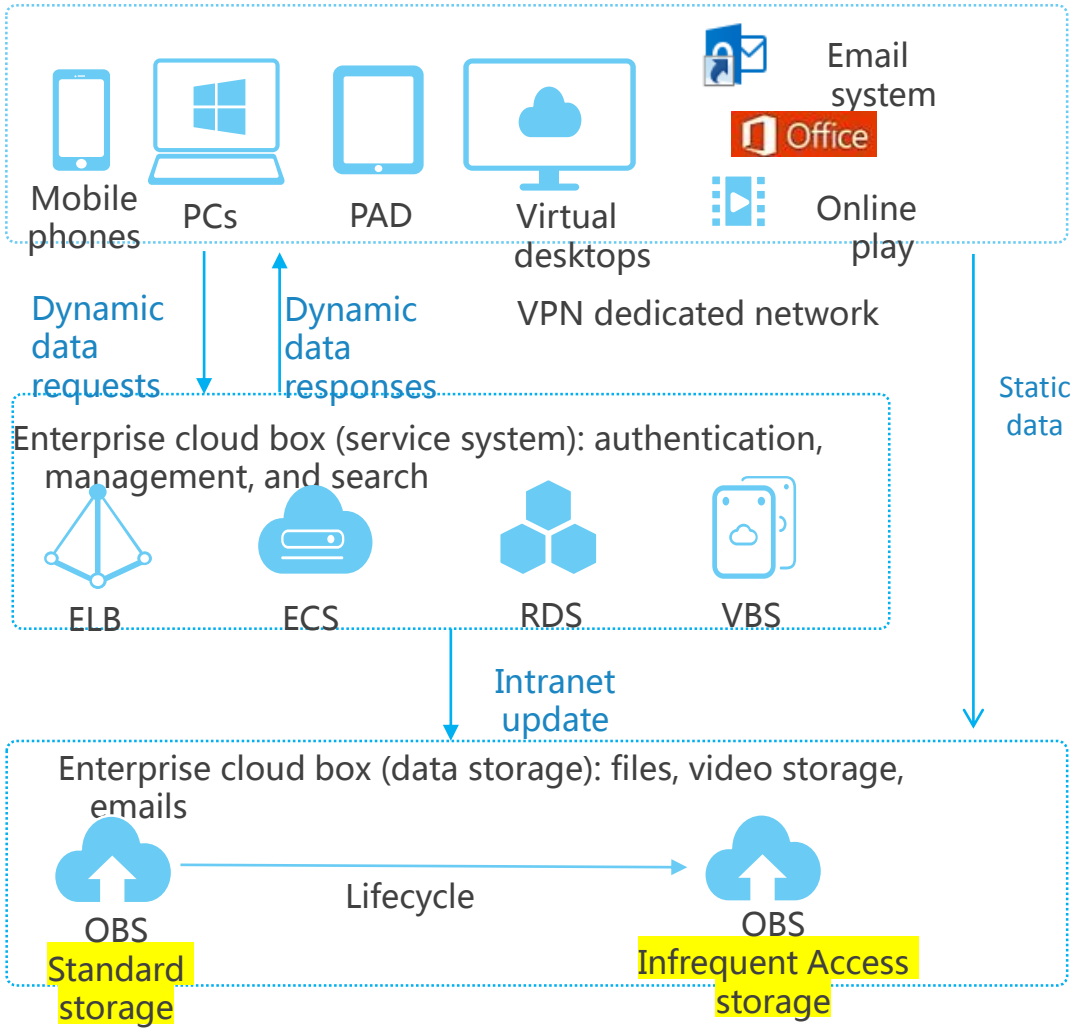
Highly secure

- End to end (E2E) security service
- 100 Gbit/s Anti-DDoS traffic cleaning
- Web Application Firewall (WAF)
- Multi-level security protection for object storage, ensuring data security

10-million TPS concurrency

- 10-million TPS concurrency and 100-billion object storage per bucket (meeting the requirements of processing 3 million concurrent access requests out from 250 million mobile users)

OBS Application Scenario - Enterprise Cloud Box



100 km disaster recovery

- 99.999999999% (11 nines) data durability
- 99.99% (4 nines) service availability

Archive storage price starts from ¥0.033/GB per month

- Lower cost of storage for data archiving
- Replacement of tape library for long-term archiving

Dual encryption

- Encrypted transmission
- Encrypted storage

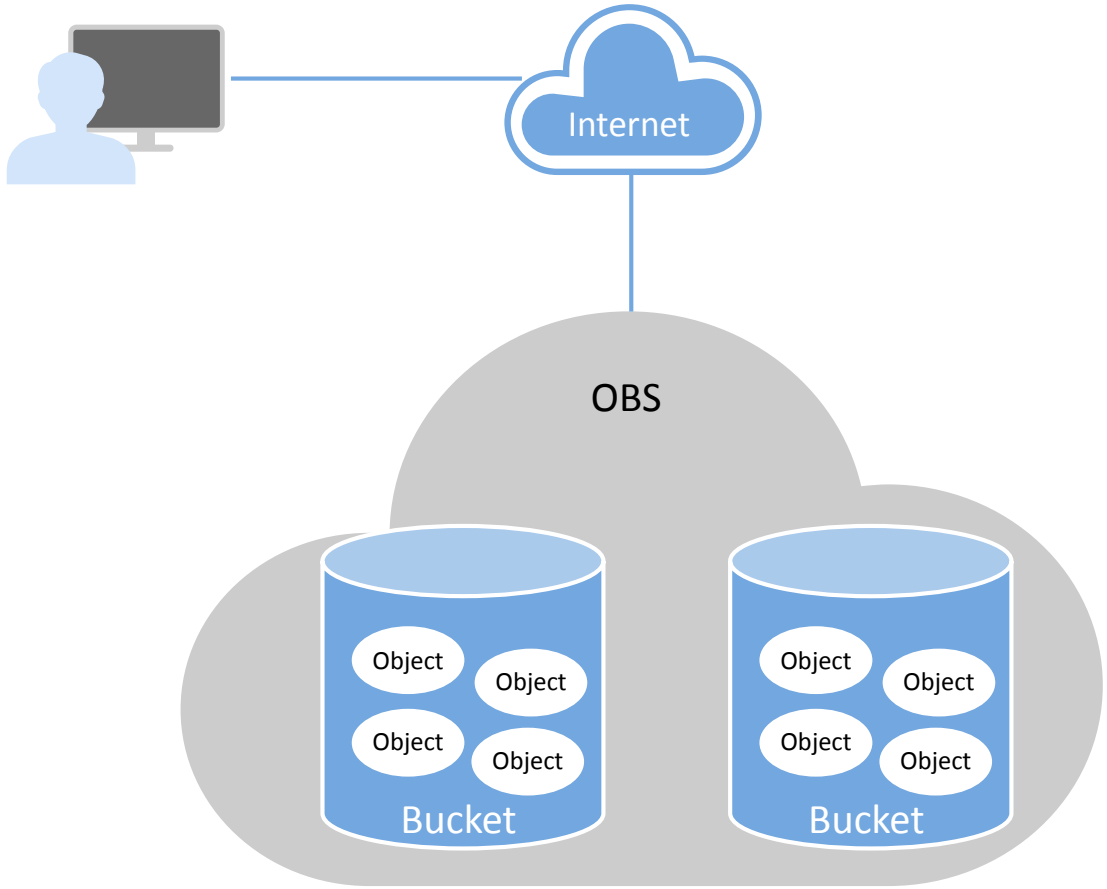
Full compatibility

- Partners and open source cloud disks provide full compatibility with applications (Windows and macOS).

Contents

Basic OBS Concepts

- Object
- Bucket
- AK and SK
- Region



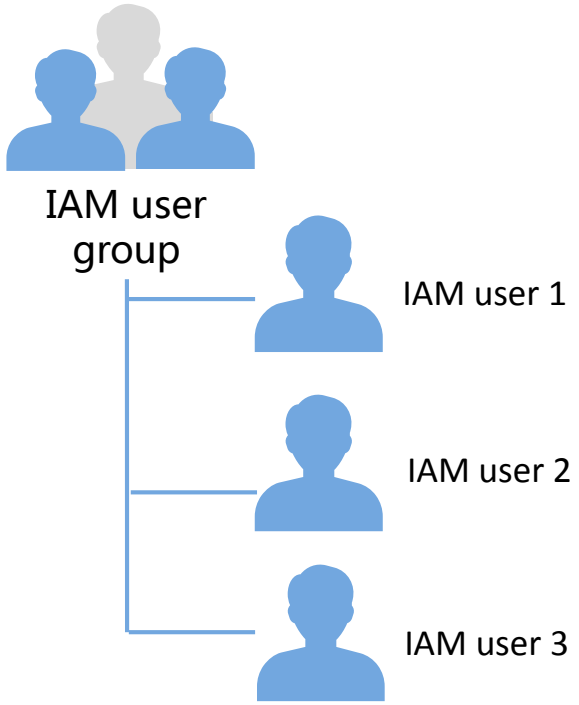
Contents

Key Functions

- Permission control
- monitoring
- Versioning
- Tags
- Event Notification
- Lifecycle management
- Static website hosting
- Server-side encryption

Permission Control (1/6)

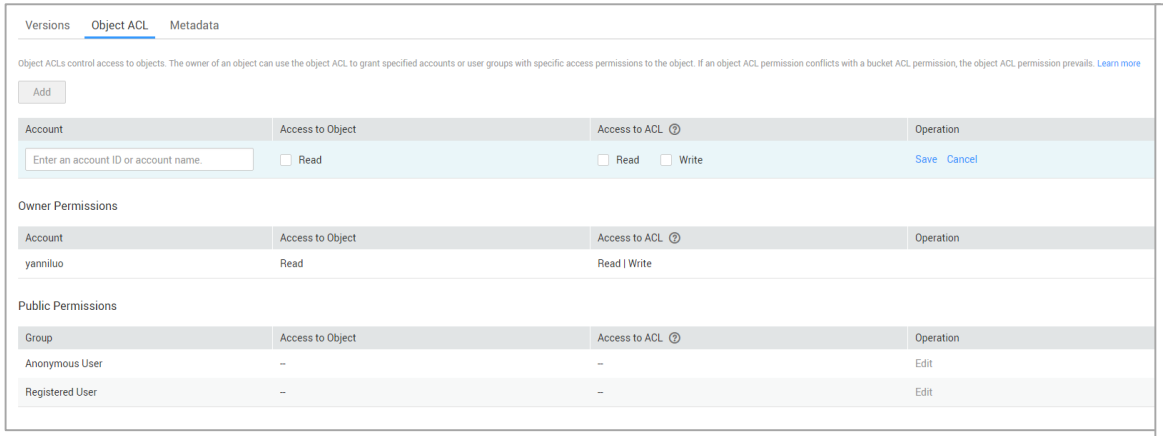
- This section describes how to set the operation permissions to OBS resources through Identity and Access Management (IAM).

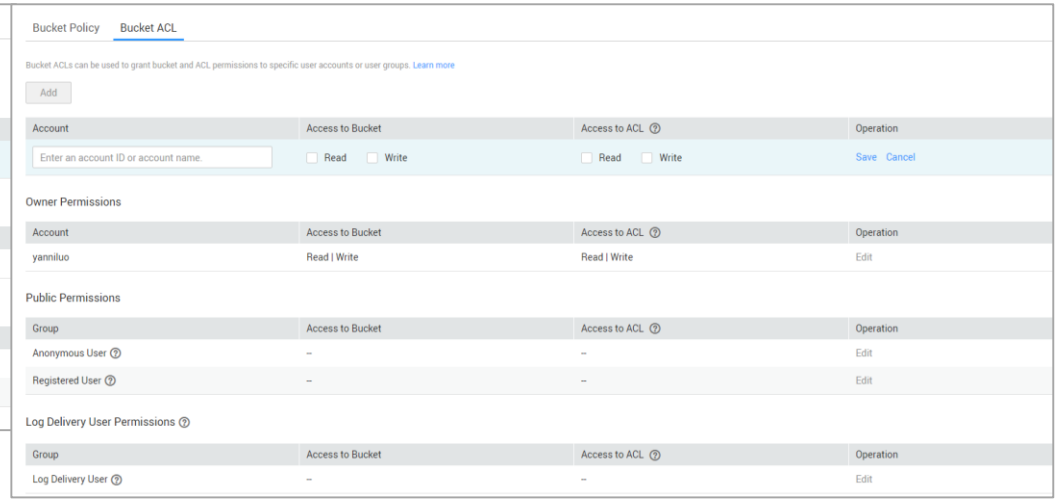


Permission	Description
Tenant Administrator	Users with this permission can perform any operation on OBS resources.
Tenant Guest	Users with this permission can query the usage of OBS resources.
OBS Buckets Viewer	Users with this permission can obtain the list, metadata, and location information of buckets.

Permission Control (2/6)

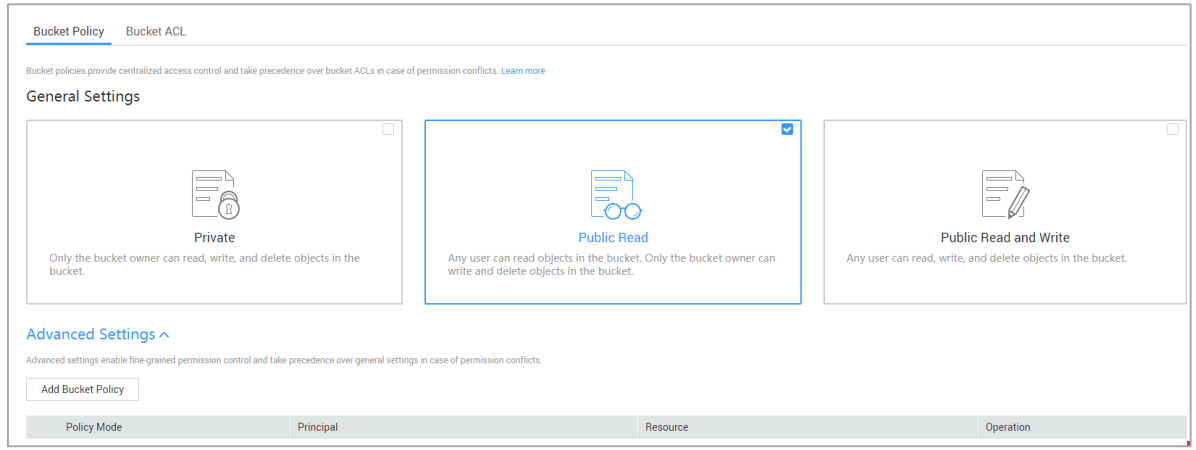
- You can configure object and bucket ACLs to control requests for accessing OBS.
- OBS provides account-based access control lists (ACLs).
  - By configuring bucket and object ACLs, you can authorize the access permission to specific users, bucket owners, anonymous users, registered users. In addition, bucket ACLs support the authorization of access permission to log delivery users.
  - Through bucket and object ACLs, you can authorize users the permissions to access buckets/objects and ACLs.

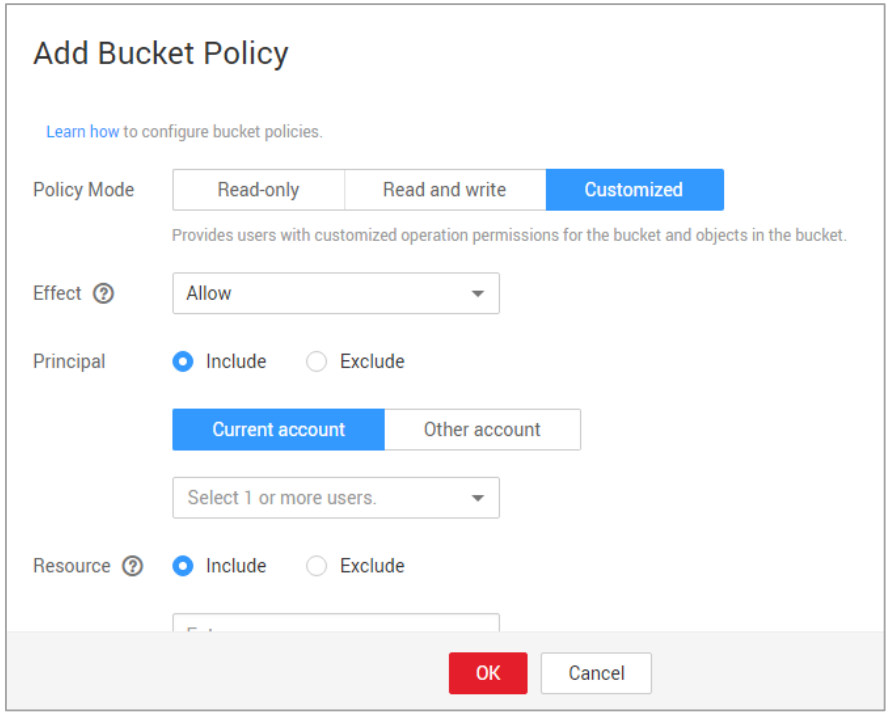




Permission Control (3/6)

- OBS supports fine-grained permission control for buckets and objects through bucket policies. If an ACL and a bucket policy conflict with each other, the bucket policy takes precedence over the ACL.





Permission Control (4/6)

- ACL authorized users

Authorized User	Description
Owner	Object owner is the account that creates the object. The owner of an object has the ACL read and write permissions permanently by default.
Anonymous User	A user that is not registered with OBS. If the access permission for a bucket and objects in the bucket is authorized to anonymous users, all users can access the bucket and its objects.
Registered User	A user that is registered with OBS. For example, a registered user can access OBS Browser using AKs and SKs.
Specific User	An account that has permission to access a bucket. The bucket owner authorizes this permission by account ID or account name.
Log Delivery User	Only bucket ACLs support this user group. A log delivery user delivers the access logs of buckets and objects to the target bucket.

Permission Control (5/6)

- ACL Permission Control

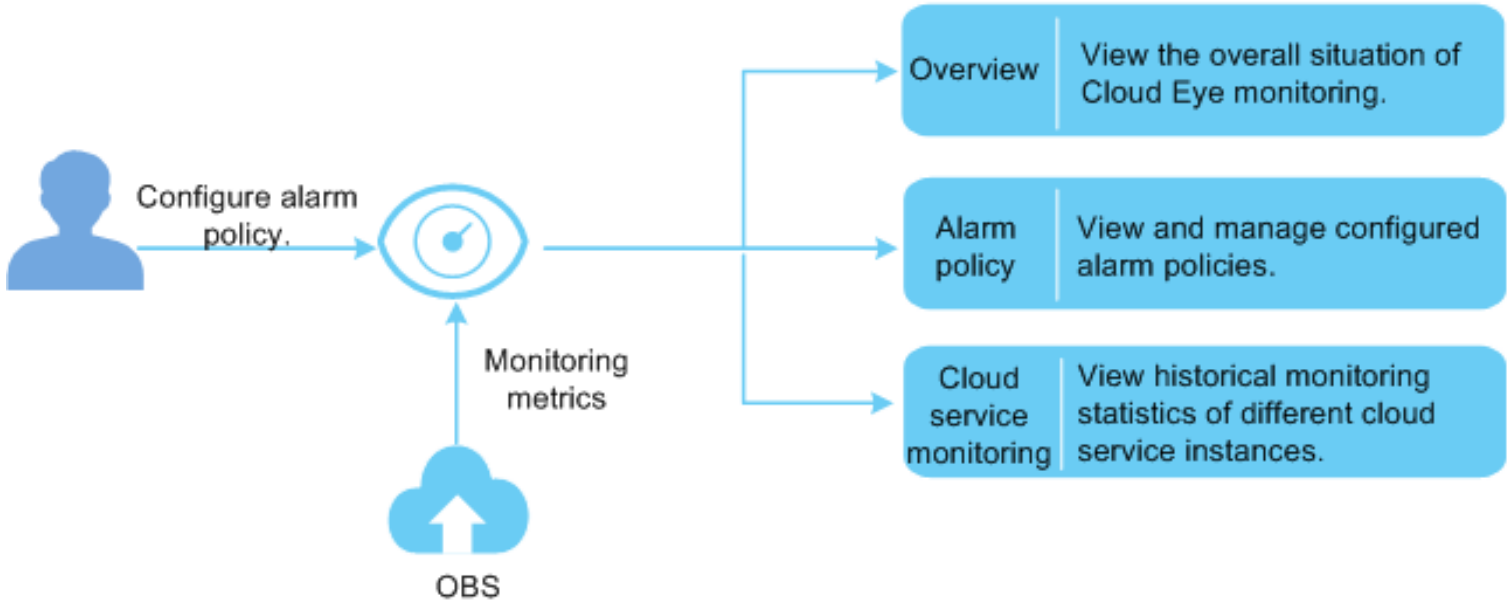
Permission		Description
Bucket access permission	Read	A grantee with this permission for a bucket can obtain the list of objects in the bucket and the metadata of the bucket.
	Write	A grantee with this permission for a bucket can upload, overwrite, and delete any object in the bucket.
Object access permission	Read	Allowed to obtain the object content and metadata.
ACL access permission	Read	Allowed to obtain the ACL of the object/bucket. The owner of this object/bucket has this permission permanently by default.
	Write	Allowed to update the ACL of the object/bucket. The owner of this object/bucket has this permission permanently by default.

Permission Control (6/6)

- Bucket policy application scenarios
  - Get object contents.
    - To obtain the content of an object in a bucket, you must configure the bucket policy (set General Settings to Public Read or configure the Customized mode in the Advanced Settings) to grant such fine-grained permissions to users.
  - Manage OBS access permissions across accounts.
    - To grant an IAM user in an account with the access permission to resources under another account, you must configure a bucket policy with advanced settings.
  - Manage all OBS operation permissions.
    - To manage all operation permissions of OBS buckets and objects, you need to configure a bucket policy with advanced settings.

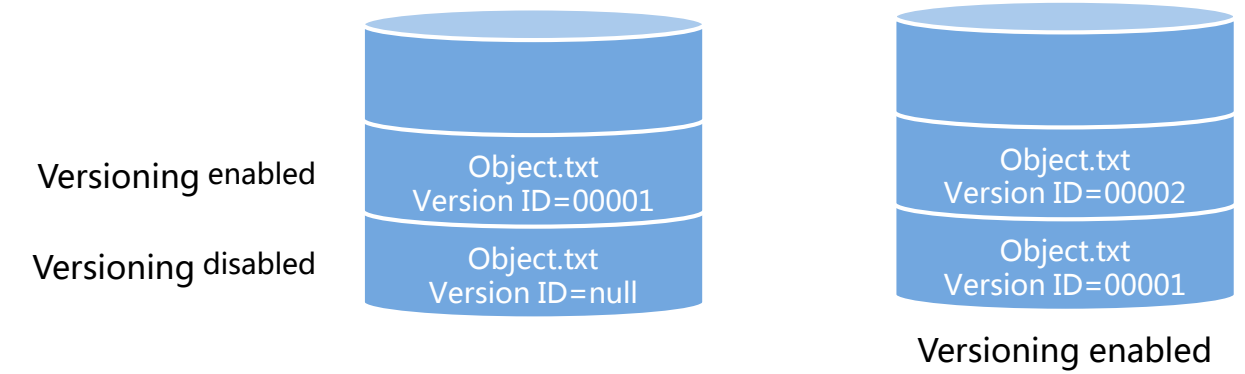
Monitoring

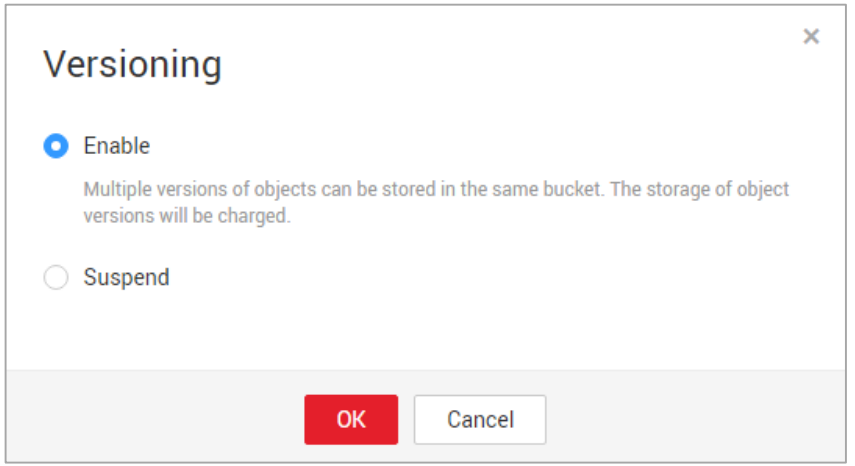
- OBS Control supports the monitoring of storage space, object counts, traffic, and number of requests. You can view the bucket monitoring information on the **Summary** page of a bucket.
- The Cloud Eye management console monitors the following statistics for buckets: upload traffic, download traffic, GET and PUT requests, average TTFB of GET requests, 4xx and 5xx errors.



Versioning (1/4)

- Enabling Versioning
  - Upload objects and check their versions.

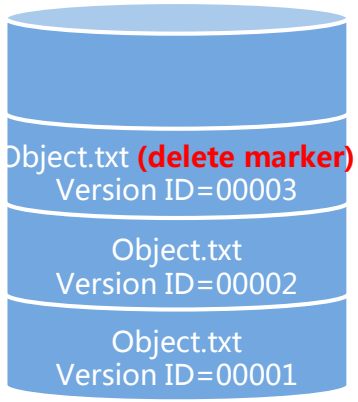




  - The latest objects in a bucket are returned by default after a GET Object request.
  - Objects can be downloaded by version IDs. By default, the latest object is downloaded if the version ID is not specified.

Versioning (2/4)

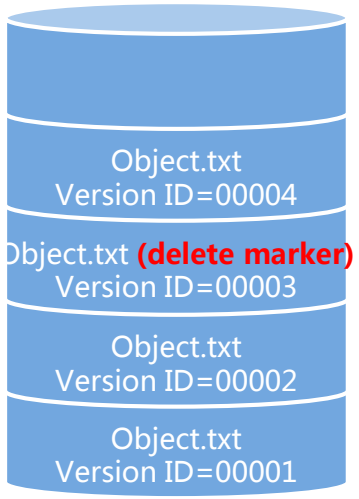
- Enabling Versioning
  - You can select an object and click **Delete** on the right to delete the object. After the object is deleted, OBS generates a **Delete Marker** with a unique version ID for the deleted object, and the deleted object is displayed in the **Deleted Objects** list. If you try to access the deleted object, a 404 error will be returned.



  - You can recover a deleted object by deleting the object version that has the **Delete Marker**.
  - After an object is deleted, you can specify the version number in **Deleted Objects** to permanently delete the object of the specified version.

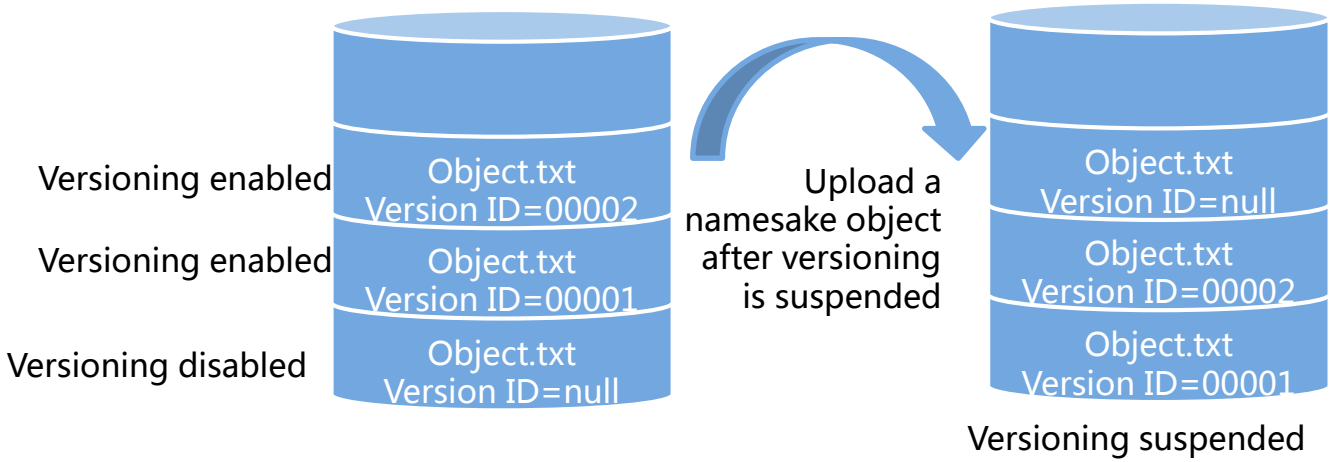
Versioning (3/4)

- Enabling Versioning
  - An object is displayed either in the object list or the list of deleted objects. It will never be displayed in both the lists at the same time. For example, after object **A** is uploaded and deleted, it will be displayed in the **Deleted Objects** list. If you upload an object named **A** again, the object **A** will be displayed in the **Objects** list, and the previously deleted object **A** will no longer be displayed in the **Deleted Objects** list.



Versioning (4/4)

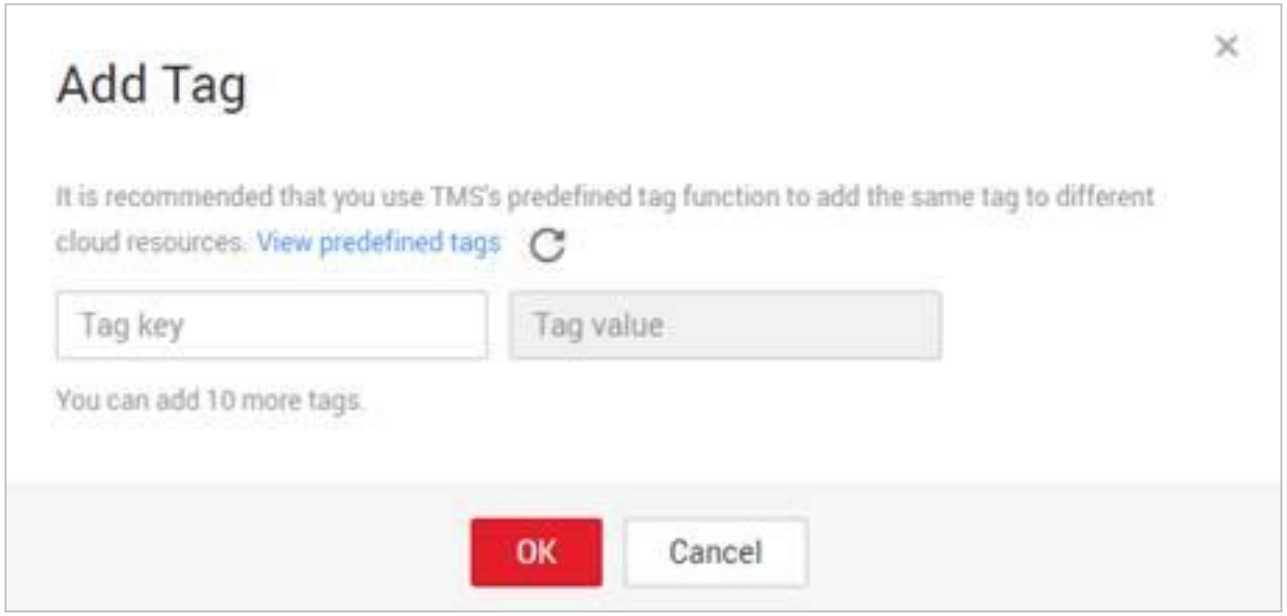
- Suspending Versioning
  - Once the versioning function is enabled, it can be suspended but cannot be disabled. Once versioning is suspended, version IDs will no longer be allocated to newly uploaded objects. If an object with the same name already exists and does not have a version ID, the object will be overwritten.



  - Historical versions will be retained in OBS. If you do not need these historical versions, manually delete them.
  - Objects can be downloaded by version IDs. By default, the latest object is downloaded if the version ID is not specified.

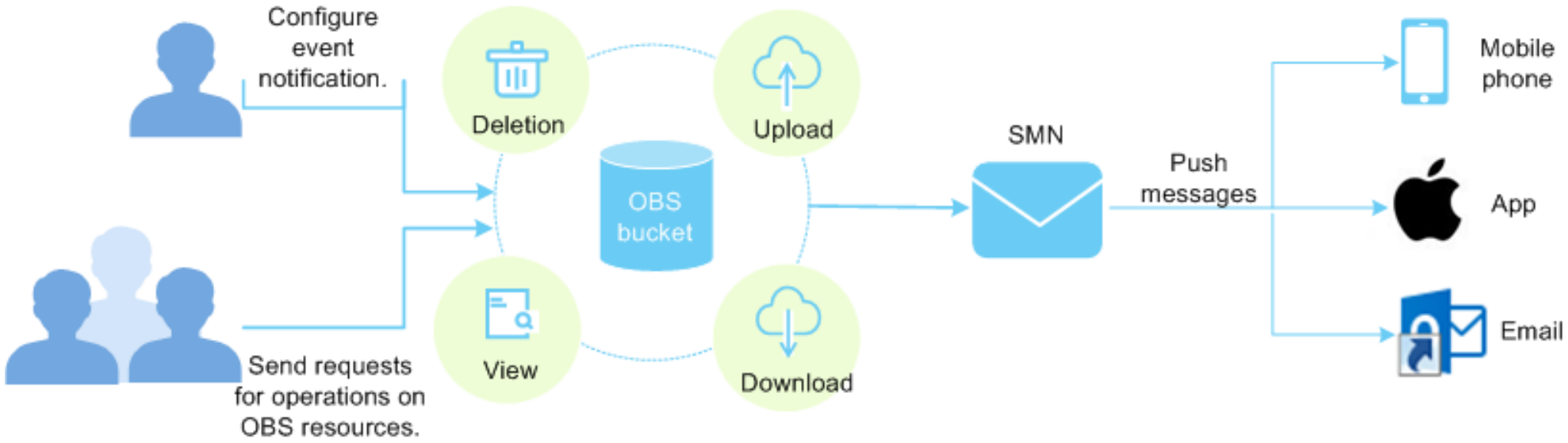
Tags

- Tags are used to identify and classify OBS buckets.
- A tag is described using a key-value pair. Each tag has only one key and one value.
- The key and value can exist in either sequence in a tag. Each key is unique among all tags of a bucket, whereas values can be repetitive or blank.



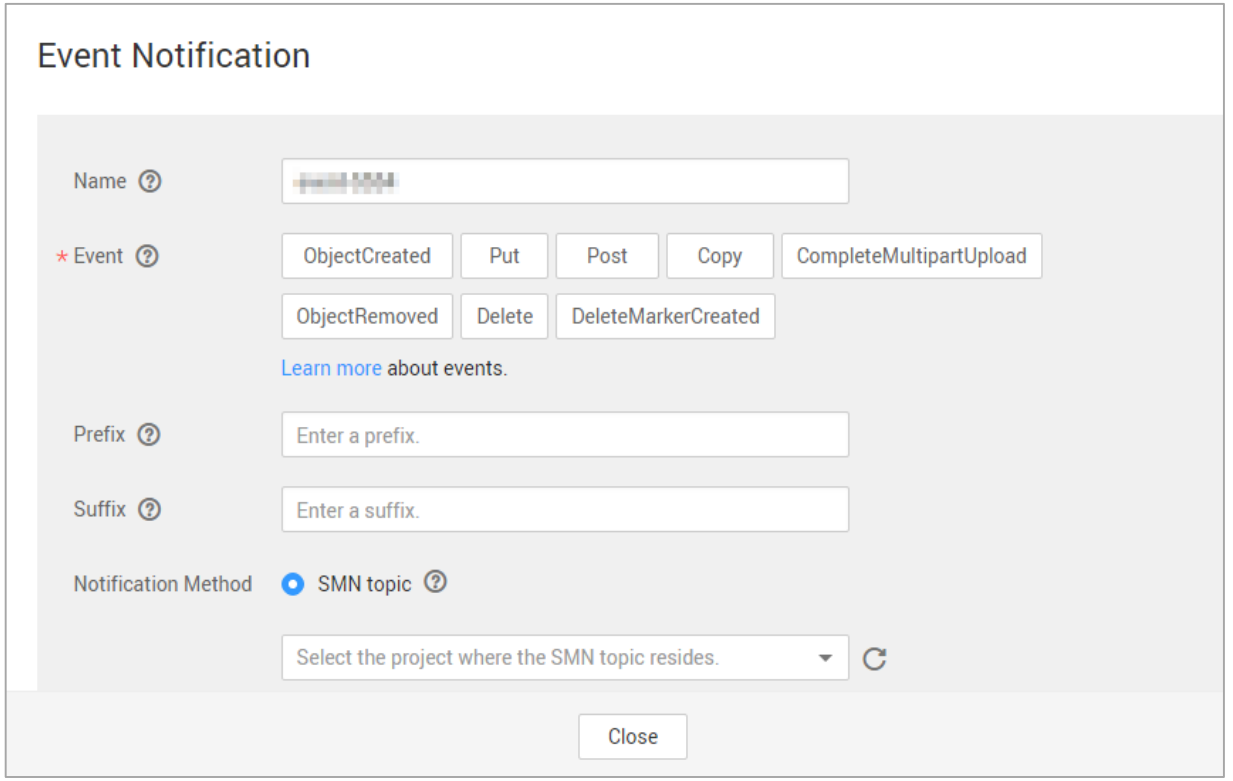
Event Notification (1/2)

- You can use Simple Message Notification (SMN) to send alarms and notifications, and trigger workflows.



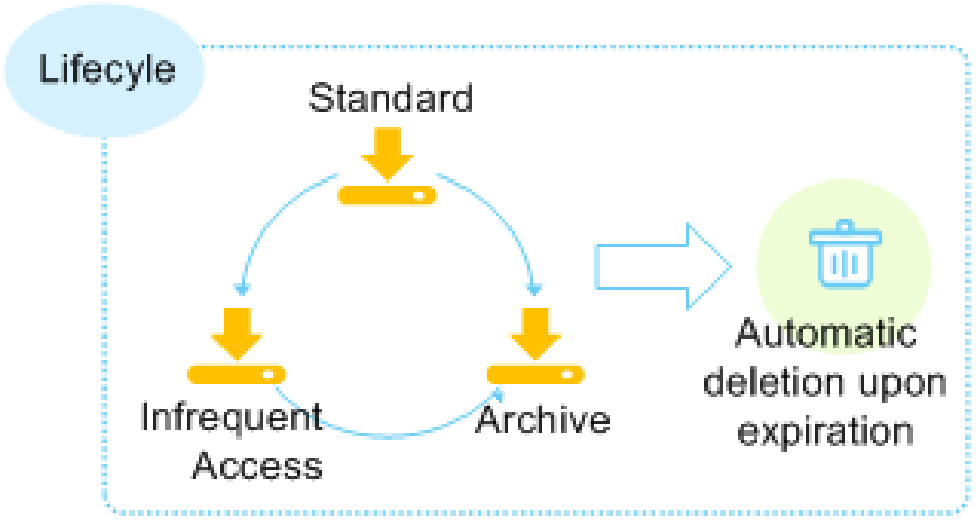
Event Notification (2/2)

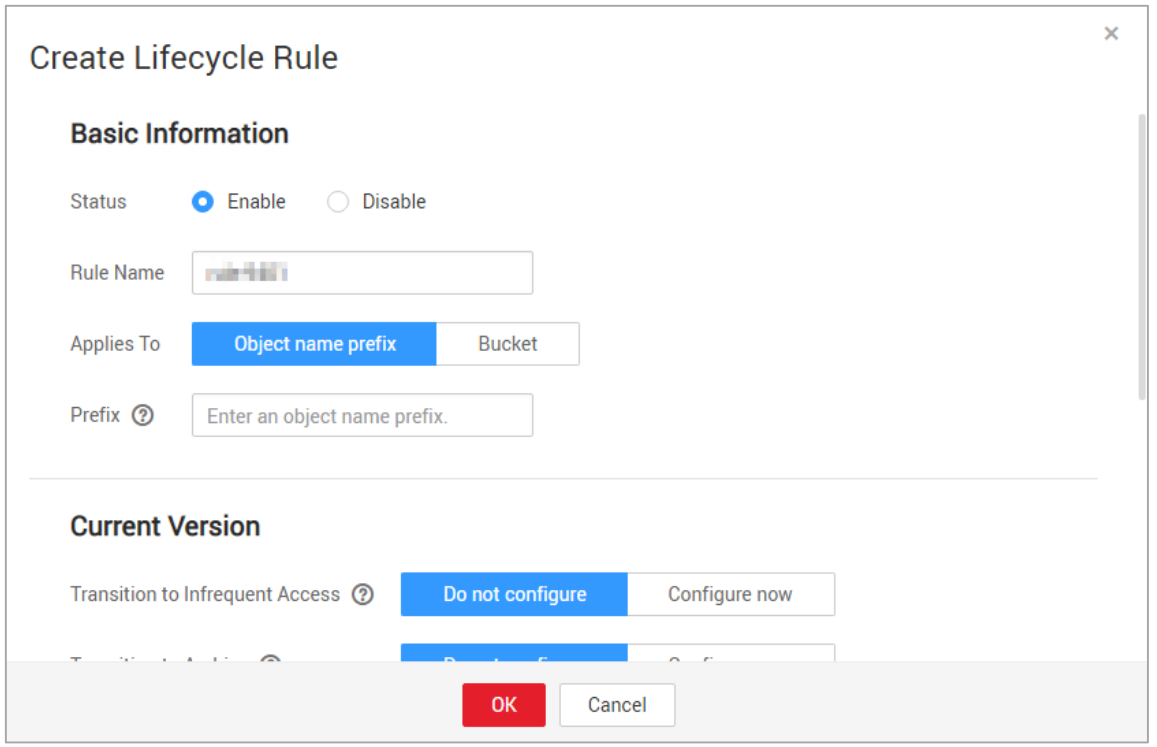
- OBS supports event notifications for the following events:
  - Upload objects using PUT.
  - Upload objects using POST.
  - Replicate objects using COPY.
  - Upload an object in multiparts.
  - Delete objects with a specific object version.
  - Delete objects with random object versions.



Lifecycle Management

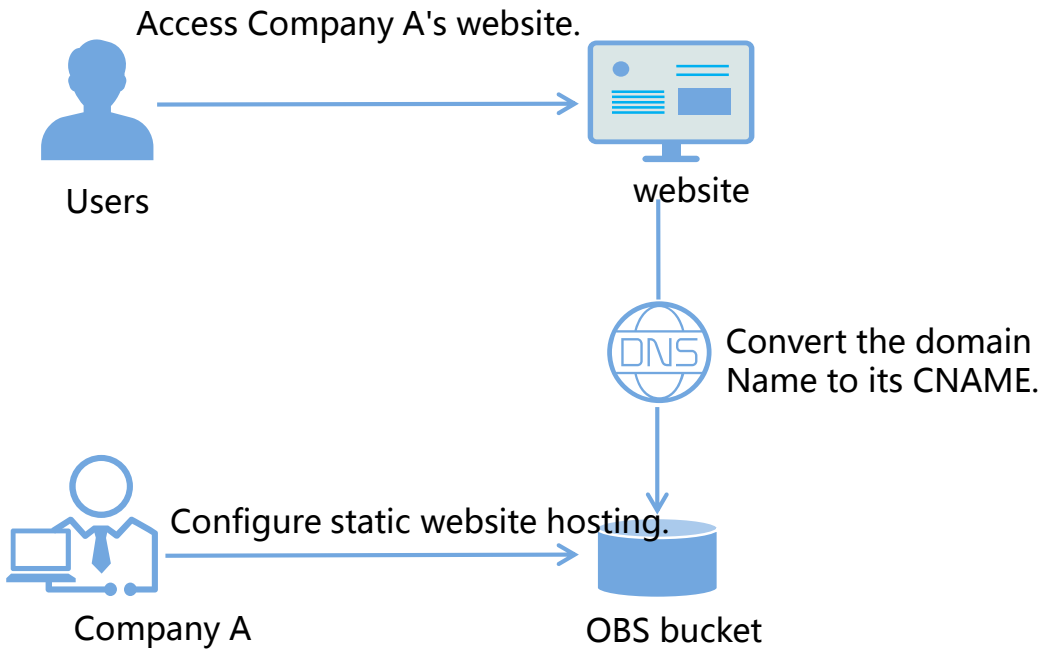
- You can manage the lifecycle of objects by configuring rules for deletion or transition.

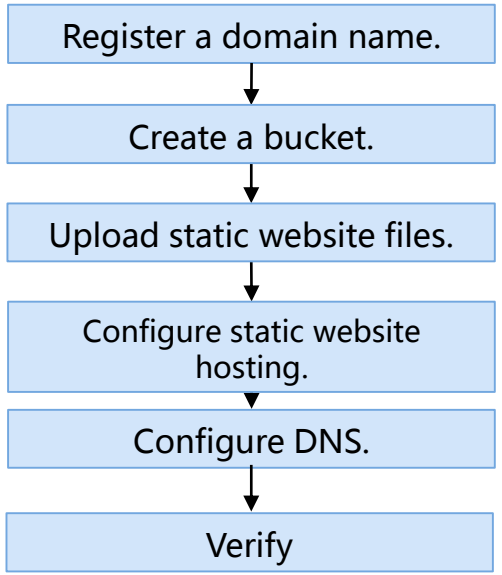




Static Website Hosting

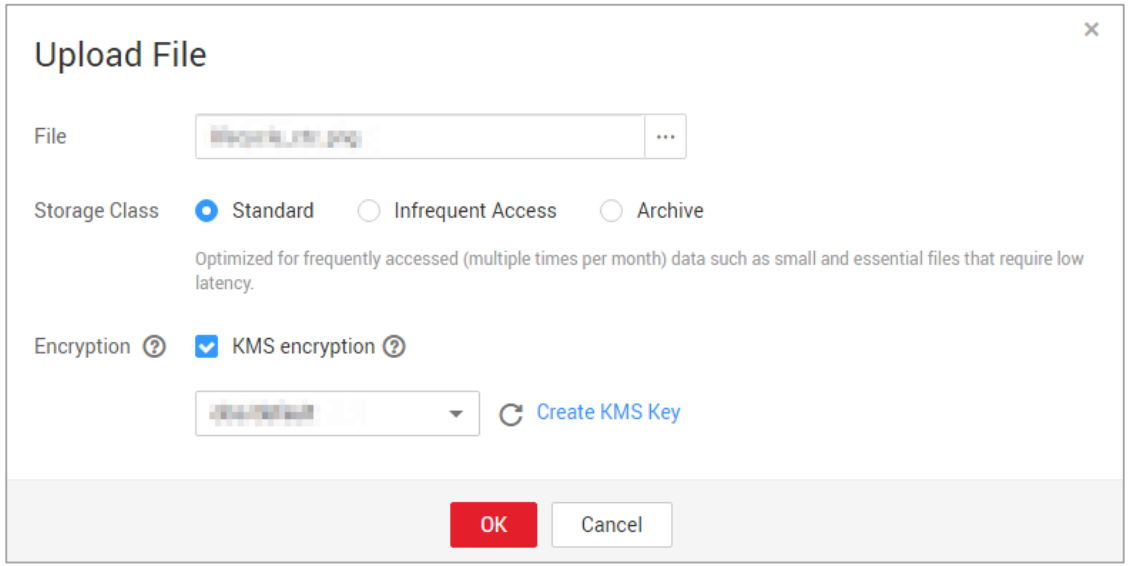
- OBS allows you to access static websites hosted by OBS.





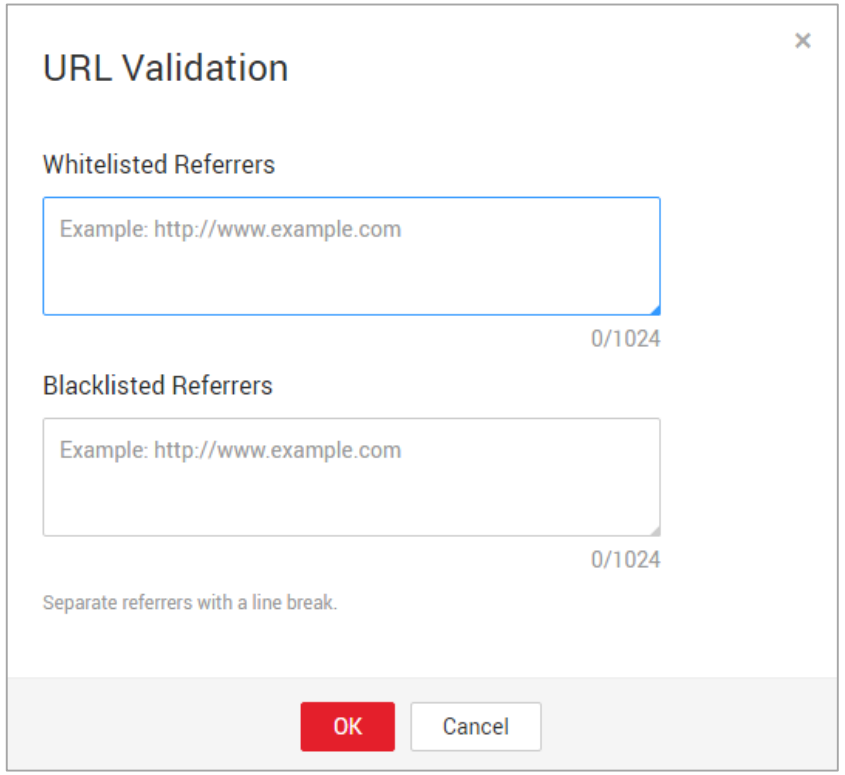
Server-side encryption

- Server-side encryption enabled:
  - When uploading an object, the object data is encrypted on the server and then stored in OBS.
  - When downloading the encrypted objects, the encrypted data will be decrypted on the server and displayed in plaintext to users.
- OBS supports both server-side encryption with KMS-managed keys (DEW-KMS) and server-side encryption with customer-provided keys (SSE-C) by invoking APIs. In SSE-C mode, OBS uses the keys and MD5 values provided by customers for server-side encryption.



URL Validation

- To prevent data in OBS from being stolen by other users, OBS supports URL validation based on the **Referer** field in HTTP headers.
- OBS also supports both whitelist and blacklist settings.
  - If the **Referer** field in a request matches the whitelist, the request is allowed.
  - If the **Referer** field in a request matches the blacklist, the request is denied or a specified page is returned.

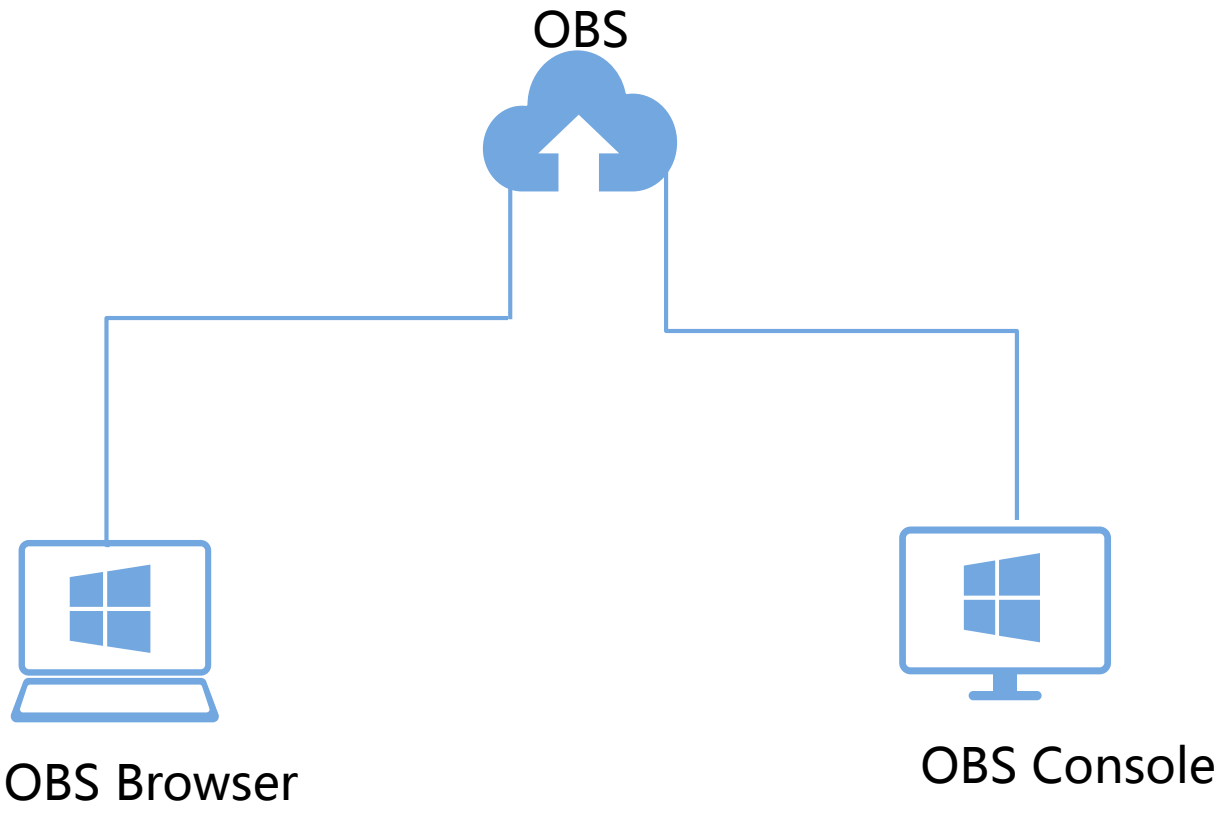


Fragments Management

- Why are fragments generated:
  - The network is in poor conditions, and the connection to the OBS server is interrupted frequently.
  - The upload task is manually suspended.
  - The device is faulty.
  - The device is powered off suddenly.
- The storage space occupied by fragments in OBS is charged.
- Fragments need to be manually cleared.

Contents

Methods for Accessing OBS



OBS Browser Management Functions

Bucket management

- Adding a bucket
- Searching for a bucket
- Viewing bucket information
- Bucket ACL
- Bucket policies
- CORS
- Logging
- Lifecycle management
- Fragment management
- Deleting a bucket
- Adding an external bucket

OBS Browser

Task management

- Managing upload tasks
- Managing download tasks
- Managing deletion tasks
- Managing rename tasks
- Managing copy tasks
- Managing move tasks
- Managing restoration tasks

Object management

- Creating a folder
- Searching for a file or folder
- Uploading a file or folder
- Downloading a file or folder
- Renaming a file
- Copying a file or folder
- Moving a file or folder
- Restoring an Archive file
- Configuring an ACL for an object
- Configuring a policy for an object
- Deleting a file or folder

Preparing the OBS Browser Environment

1. Log in to OBS Console to obtain the OBS Browser software package.

On the home page of OBS Console, download the OBS Browser software package through the link based on your operating system.

2. Create an access key (AK and SK).
   a. In the upper right corner of the OBS Console page, click the username and choose **My Credential**.
   b. On the **My Credential** page, click **Add Access Key** below the **Access Keys** area.
   c. Enter the related information as prompted and save the newly created access key.
3. Log in to OBS Browser.
   a. Decompress the OBS Browser software package.
   b. Double-click **obs.exe** to run OBS Browser.
   c. In the **Manage Account** dialog box that is displayed, click **Add Account**.
   d. Enter the account information and click **OK**. Then you can log in to the storage service using the account and check bucket and object resources owned by the account.

Using OBS Browser (1/4)

- Adding a bucket
  - Click **Add Bucket** in the upper left corner of the OBS browser home page.
  - In the **Add Bucket** dialog box that is displayed, set **Method** to **Create new bucket**, enter a region name and bucket name, and select a storage class for the bucket. Then click **OK**.
  - In the displayed dialog box, click **OK**.

  The newly created bucket is displayed in the list.

Using OBS Browser (2/4)

- Uploading a file or folder

  You can use OBS Browser to upload files in multiparts. It supports the upload of a single file with the maximum size of 48.8 TB.

  OBS Browser supports resumable transfer.

  - Click the bucket name to go to the object management page.
  - Choose **Upload** > **Upload File**. You can upload a maximum of 500 files at a time.
  - Alternatively, you can click **Upload**, and choose **Upload Folder** to upload a folder.
  - Select a storage class.
  - Click **OK**.

  Click  in the upper right corner of the page to enter the task management page. On the page that is displayed, you can manage the upload tasks.

Using OBS Browser (3/4)

- Downloading a file or folder
  - Click the bucket name to go to the object management page.
  - Select the file or folder to be downloaded and click **Download**.
  - Select a storage path and click Download.

  Click in the upper right corner of the page to enter the task management page. On the page that is displayed, you can manage the download tasks.
- Deleting a file or folder
  - Click the bucket name to go to the object management page.
  - Click ··· next to the file or folder to be deleted and select **Delete**.
  - In the dialog box that is displayed, click **OK**.

Using OBS Browser (4/4)

- Deleting a bucket

  Before deleting a bucket, ensure that all objects in the bucket have been deleted.

  Only the bucket owner can delete a bucket.

  - Click ··· next to the bucket to be deleted and select **Delete**.
  - Click **OK** in the confirmation dialog box.
  - In the dialog box that is displayed, click **OK**.

Contents

FAQs and Troubleshooting

Question 1

- After an object with a long name is downloaded to the local path using OBS Console, why does the object name change?

Answer

- For Windows, a file name can contain a maximum of 255 characters, including the file name and file name extension. When an object with a name containing more than 255 characters is downloaded to a local computer, the system keeps only the first 255 characters automatically.

FAQs and Troubleshooting

Question 2

- A user logs in to OBS Console using Internet Explorer 11 and uploads an object. When the user attempts to download the object to the original path to replace the original object without closing the browser, a message is displayed indicating a download failure. Why is this?

For example, a user uploads object **abc** from the root directory of local drive C to a bucket on OBS Console. When the user attempts to download the object to the root directory of local drive C to replace the original object without closing the browser, a message is displayed indicating a download failure.

Answer

- This problem is caused by browser incompatibility. It can be solved by using Google Chrome as the browser. Alternatively, you can close the browser and try again.

FAQs and Troubleshooting

Question 3

- Why cannot objects be globally searched for in a bucket? For example, if the root directory of bucket **abc** contains folder **A** and object **B** and folder **A** contains object **C**, object **C** cannot be searched for in the root directory of bucket **abc**. It can be searched for only in folder **A**.

Answer

- OBS Console does not support iterative query of objects in a bucket but supports query of objects in a directory only. If you want to search for an object, go to the directory where the object resides and search for the object.

FAQs and Troubleshooting

Question 4

- Why is no upload task created and nothing displayed on the page after a large number of files are selected for upload using OBS Browser? For example, after a user logs in to OBS Browser and chooses **Upload** > **Upload File** to select a large number of files from drive C for upload, no upload task is created and nothing is displayed on the page.

Answer

- The total name length of all files to be uploaded cannot exceed 25,500 characters (approximate value). If the name length exceeds the threshold, the system stops responding to the upload request. The file uploading function of OBS Browser allows 500 files to be uploaded at the same time. If more files need to be uploaded, it is recommended that you put the files in a folder and use the folder uploading function for upload.

FAQs and Troubleshooting

Question 5

- Why are the relevant tasks not displayed in the task list when objects are being uploaded, downloaded, or deleted using OBS Browser?

Answer

- When you use OBS Browser to upload, download, or delete objects, the internal database of OBS Browser is invoked. By default, binary data generated while the database is running is saved in the personal folder of the Windows operating system user.
- If the username of the Windows operating system contains non-English characters, the internal database of OBS Browser cannot identify the save path of data. As a result, upload, download, and deletion tasks cannot be added to the task list. In this case, click **System Configuration** > **Other** in the upper right corner of the page to change the save path to ensure that the database is running properly.

FAQs and Troubleshooting

Question 6

- OBS is unavailable when an error is reported stating "Time difference is longer than 15 minutes between the client and server." Why is this?

Answer

- For security purpose, OBS checks the time difference between OBS Browser and the server. When the time difference is longer than 15 minutes, such an error is reported and you need to adjust the local time.

Contents

Reference Documents and Websites

- OBS Overview:

  https://support.huaweicloud.com/en-us/productdesc-obs/en-us_topic_0045853681.html
- OBS Console Operation Guide:

  https://support.huaweicloud.com/en-us/usermanual-obs/obs_03_0054.html
- OBS Client Operation Guide (OBS Browser):

  https://support.huaweicloud.com/en-us/clientogw-obs/en-us_topic_0086375542.html
- OBS Developer Guide:

  https://support.huaweicloud.com/en-us/devg-obs/en-us_topic_0100849894.html

Quiz

1. **(Multiple choices)** Access requests to OBS can be controlled by ( )

   A. ACLs

   B. Bucket policies

   C. User signature authentication

   D. Server-side encryption

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Summary

- Introduces OBS.
- Introduces the concepts, functions, and application scenarios of OBS.
- Introduces the advantages and charging standards of OBS.

Acronym or Abbreviation

Abbreviation	Full Name
API	Application programming interface
AK	Access key ID
SK	Secret access key
ACL	Access control list
SDK	Software development kit
CORS	Cross-origin resource sharing


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