Cloud Backup and Recovery

Service Overview

Issue 06

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Contents

1 What Is CBR?

Overview

Cloud Backup and Recovery (CBR) enables you to easily back up Elastic Cloud Servers (ECSs), Bare Metal Servers (BMSs), Elastic Volume Service (EVS) disks, SFS Turbo file systems, local files and directories, and on-premises VMware virtual environments. In case of a virus attack, accidental deletion, or software or hardware fault, you can use the backup to restore data to any point when the data was backed up.

CBR Architecture

CBR involves backups, vaults, and policies.

Backup

A backup is a copy of a particular chunk of data and is usually stored elsewhere so that it may be used to restore the original data in the event of data loss. There are the following types of backups:

- Cloud disk backup: provides snapshot-based backups for EVS disks.
- Cloud server backup: uses the consistency snapshot technology to protect data for ECSs and BMSs. Backups of non-database servers are non-database server backups, and those of database servers are application-consistent backups.
- SFS Turbo backup: backs up data of SFS Turbo file systems.
- Hybrid cloud backup: protects data of on-premises OceanStor Dorado storage systems and VMware VMs by storing their backups to the cloud. You can manage the backups on the CBR console.
- File backup: backs up data of a single or multiple files, instead of the entire cloud servers or on-premises hosts.
- Desktop backup: backs up data of Workspace desktops.

Vault

CBR stores backups in vaults. Before creating a backup, you need to create at least one vault and associate the resources you want to back up with the vaults. Then the resources can be backed up to the associated vaults.

Vaults can be either backup vaults or replication vaults. Backup vaults store resource backups, and replication vaults store backup replicas.

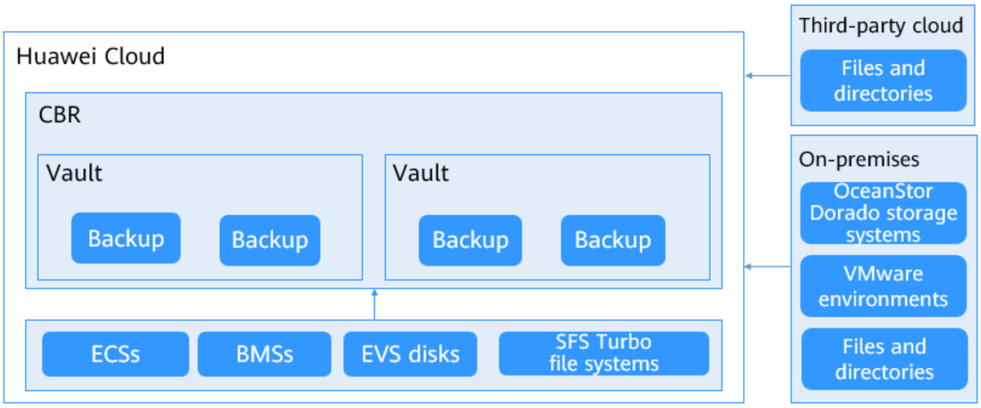
Different types of resources must be backed up to different types of vaults. For example, cloud servers must be backed up to server backup vaults, not disk backup vaults or any other types of vaults.

Policy

There are backup policies and replication policies.

- A backup policy defines when you want to take a backup and for how long you would retain each backup.
- A replication policy defines when you want to replicate from backup vaults and for how long you would retain each replica. Backup replicas are stored in replication vaults.

Figure 1-1 CBR architecture



Differences Among the Backup Types

Table 1-1 Differences among the backup types

Item	Cloud Server Backup	Cloud Disk Backup	SFS Turbo Backup	Desktop Backup	Hybrid Cloud Backup	File Backup
What to back up	All disks (system and data disks) on a server	One or more specific disks (system or data disks)	SFS Turbo file systems	Entire Workspace desktop systems, including all disks	Backups of on-premises hosts and VMs	A single or multiple files on cloud servers or on-premises hosts

Item	Cloud Server Backup	Cloud Disk Backup	SFS Turbo Backup	Desktop Backup	Hybrid Cloud Backup	File Backup
When to use	You want to back up entire cloud servers.	You want to back up only data disks.	You want to back up entire SFS Turbo file systems.	You want to back up entire Workspace desktops.	You want to manage backups of on-premises servers and restore data on the cloud.	You want to back up and restore a single or multiple files on the cloud.
Advantages	All disks on a server are backed up at a time.	Only data of specific disks is backed up, which costs less than backing up an entire server.	File system data and their backups are stored separately, and the backups can be used to create new file systems.	Desktop data and their backups are stored separately, and the backups can be used to create new desktops.	On-premises data can be backed up to the cloud and used to re-build services in the cloud.	You can back up data by file or directory, which is inexpensive than backing up an entire server or a disk.

Backup Mechanism

CBR in-cloud backup offers block-level backup, and provides file-level backup. The first backup is a full backup and backs up all used data blocks. For example, if a disk size is 100 GB and 40 GB has been used, only the 40 GB of data is backed up. An incremental backup backs up only the data changed since the last backup to save the storage space and backup time.

When a backup is deleted, data blocks will not be deleted if they are depended on by other backups, ensuring that other backups can still be used for restoration. Both a full backup and an incremental backup can be used to restore data to a given backup point in time.

When creating a backup of a disk, CBR also creates a snapshot for it. CBR keeps only the latest snapshot. Every time it creates a new snapshot during backup, it deletes the old snapshot.

CBR stores backups in OBS to ensure data security.

Backup Options

CBR supports one-off backup and periodic backup. A one-off backup task is manually created and is executed only once. Periodic backup tasks are automatically executed based on a user-defined backup policy.

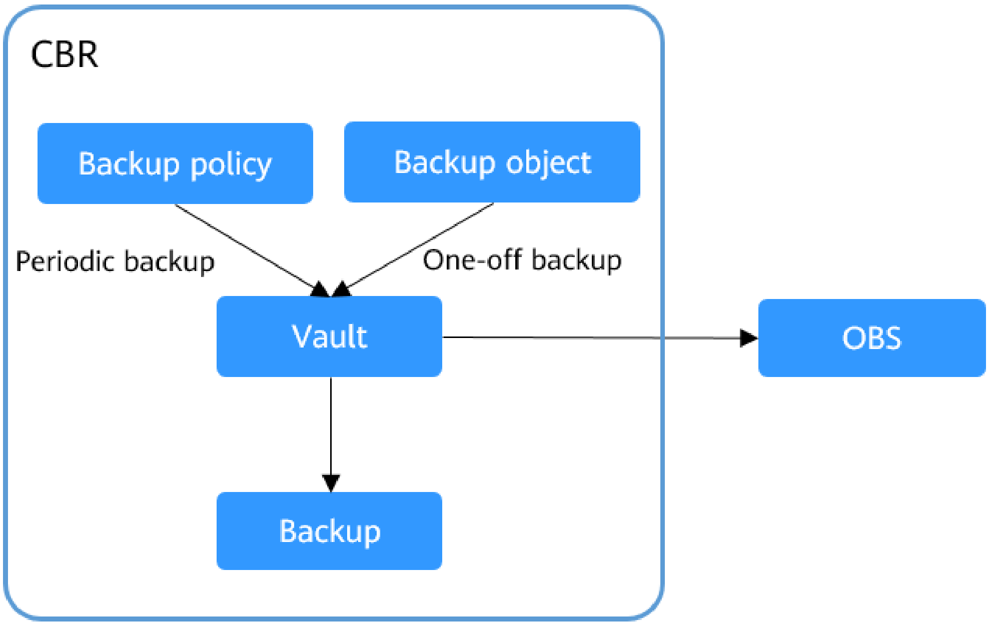
Table 1-2 compares the two backup options.

Table 1-2 One-off backup and periodic backup

Item	One-Off Backup	Periodic Backup
Backup policy	Not required	Required
Number of backup tasks	One manual backup task	Periodic tasks triggered by a preset backup policy
Backup name	User-defined backup name, which is **manualbk_***xxxx* by default	System-assigned backup name, which is **autobk_***xxxx* by default
Backup mode	The first backup is a full backup and the consecutive backups are incremental.	The first backup is a full backup and the consecutive backups are incremental.
Application scenario	Executed before patching or upgrading the OS or upgrading an application. A one-off backup can be used for restoration if the patching or upgrading fails.	Executed for routine maintenance. The latest backup can be used for restoration if an unexpected failure or data loss occurs.

You can also use the two backup options together if needed. For example, you can associate resources with a vault and apply a backup policy to the vault to execute periodic backup for all the resources in the vault. Additionally, you can perform a one-off backup for the most important resources to enhance data security. **Figure 1-2** shows the use of the two backup options.

Figure 1-2 Use of the two backup options



Access to CBR

You can access the CBR service through the console or by calling HTTPS-based APIs.

- Console

  Use the console if you prefer a web-based UI. Log in to the console and choose **Cloud Backup and Recovery**.

- APIs

  Use APIs if you need to integrate CBR into a third-party system for secondary development. For details, see **Cloud Backup and Recovery API Reference**.

2 Advantages

Reliable

CBR offers crash-consistent backup for multiple disks on a server and application-consistent backup for database servers. The backups protect against human errors, virus attacks, and natural disasters, and ensure your data security and reliability.

Efficient

Incremental forever backups shorten the time required for backup by 95%. With Instant Restore, CBR offers an RPO of as low as 1 hour and an RTO of only several minutes.

NOTE

Recovery Point Objective (RPO) specifies the maximum acceptable period in which data might be lost.

Recovery Time Objective (RTO) specifies the maximum acceptable amount of time for restoring the entire system after a disaster occurs.

Easy to Use

CBR is easier to use than conventional backup systems. You can complete backup in just three steps, and no professional backup skills are required.

Secure

If the disks are encrypted, their backups are also encrypted to ensure data security.

You can also replicate backups across regions to implement remote disaster recovery.

3 Application Scenarios

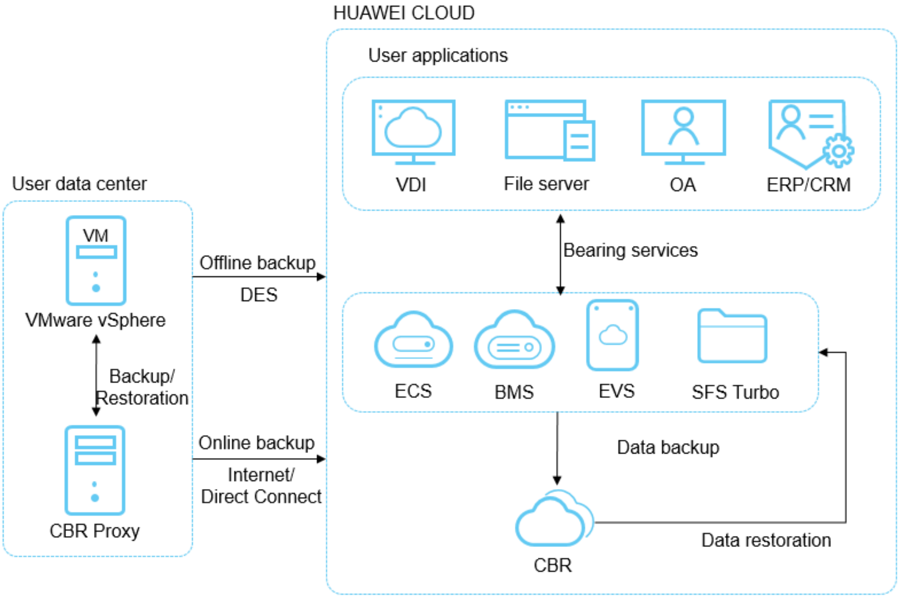
CBR is ideal for data backup and restoration. The backups can maximize your data security and consistency.

Data Backup and Restoration

You can use CBR to quickly restore data to the latest backup point if any of the following incidents occur:

- Hacker or virus attacks
- Accidental deletion
- Application update errors
- System breakdown

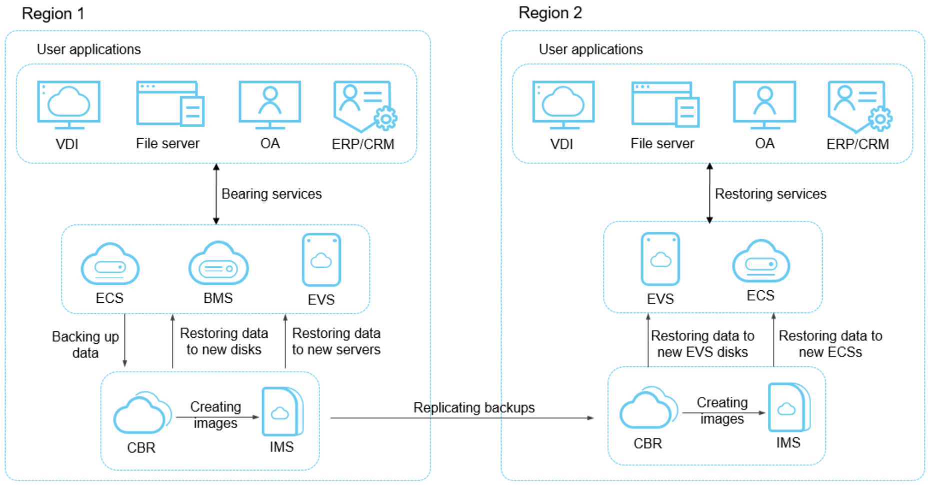
Figure 3-1 Data backup and restoration



Rapid Migration & Deployment

You can use cloud server backups to create images and then use such images to quickly provision new cloud servers with the same configuration as existing ones. See **Figure 3-2**.

Figure 3-2 Rapid migration and deployment



4 Functions

Table 4-1 lists the functions of CBR.

Before using CBR functions, it is recommended that you learn about **basic CBR concepts**.

Table 4-1 CBR functions

Category	Function	Description
Cloud disk backup	**Manual disk backup**	Cloud disk backup provides snapshot-based backup for EVS disks on servers. You can back up specific disks to protect data on them.
Cloud disk backup	**Policy-based backup**	You can create, modify, or delete a backup policy. A backup policy defines the schedule and retention for automatic backups.
Cloud disk backup	**Backup management**	You can set search criteria to quickly find the backups you want to manage. Then you can view their details, share, restore, or delete them if needed.
Cloud disk backup	**Disk restoration using backups**	When a disk is faulty, or their data is lost, you can use a backup to quickly restore the data.
Cloud disk backup	**Disk creation using backups**	You can use a disk backup to create a disk that contains the same data as the backup.
Cloud disk backup	**Backup sharing**	You can share a disk backup with other accounts to allow them to use the backup to create disks.

Category	Function	Description
Cloud server backup	**Manual server backup**	Cloud server backup uses the consistency snapshot technology to protect data for ECSs and BMSs. You can use CBR to back up an entire server to protect their data, especially when high data consistency is required, such as in RAID clusters.
Cloud server backup	**Backup of specific disks on a server**	You can create a single backup for multiple disks on a server to save the vault space.
Cloud server backup	**Policy-based backup**	You can create, modify, or delete a backup policy. A backup policy defines the schedule and retention for automatic backups.
Cloud server backup	**Backup management**	You can set search criteria to quickly find the backups you want to manage. Then you can view their details, share, restore, replicate, or delete them if needed.
Cloud server backup	**Server restoration using backups**	When a server is faulty, or their data is lost, you can use a backup to quickly restore the data.
Cloud server backup	**Backup sharing**	You can share a server backup with other accounts to allow them to use the backup to create servers.
Cloud server backup	**Image creation using server backups**	You can create images from ECS backups and then use the images to quickly provision ECSs to restore service.
Cloud server backup	**Database server backup**	Cloud server backup supports application-consistent backup in addition to crash-consistent backup. You can use cloud server backup to back up ECSs running MySQL or SAP HANA databases, because application-consistent backup ensures that the backed-up data is transactionally consistent.

Category	Function	Description
Cloud server backup	**Cross-region replication**	You can replicate backups from one region to another and then use the replicas in the destination region to create images and provision servers.
SFS Turbo backup	**Manual SFS Turbo backup**	You can back up SFS Turbo file systems and use the backups create new SFS Turbo file system.
SFS Turbo backup	**Policy-based backup**	You can create, modify, or delete a backup policy. A backup policy defines the schedule and retention for automatic backups.
SFS Turbo backup	**Backup management**	You can set search criteria to quickly find the backups you want to manage. Then you can view their details, share, restore, replicate, or delete them if needed.
SFS Turbo backup	**File system creation using backups**	You can use an SFS Turbo file system backup to create a file system that contains the same data as the backup.
SFS Turbo backup	**Cross-region replication**	You can replicate backups from one region to another and then use the replicas in the destination regions to create file systems.
Hybrid cloud backup	**Synchronization of on-premises server backups to the cloud**	If an on-premises VMware VM has been backed up offline and the backups has been uploaded to an OBS bucket, you can synchronize the backups from the OBS bucket to a hybrid cloud backup vault for disaster recovery.
Hybrid cloud backup	**Server restoration using backups**	You can use the backups in the hybrid cloud backup vault to restore data to cloud servers for disaster recovery, service migration, development, and testing.
File backup	**File backup**	You can back up files and directories on your cloud servers and on-premises hosts, instead of backing up the entire servers or disks.

Category	Function	Description
File backup	**Data restoration using backups**	If data of a file is lost due to accidental deletion or virus attack, you can use the backups to restore the data.

5 Security

5.1 Shared Responsibilities

Huawei guarantees that its commitment to cyber security will never be outweighed by the consideration of commercial interests. To cope with emerging cloud security challenges and pervasive cloud security threats and attacks, Huawei Cloud builds a comprehensive cloud service security assurance system for different regions and industries based on Huawei's unique software and hardware advantages, laws, regulations, industry standards, and security ecosystem.

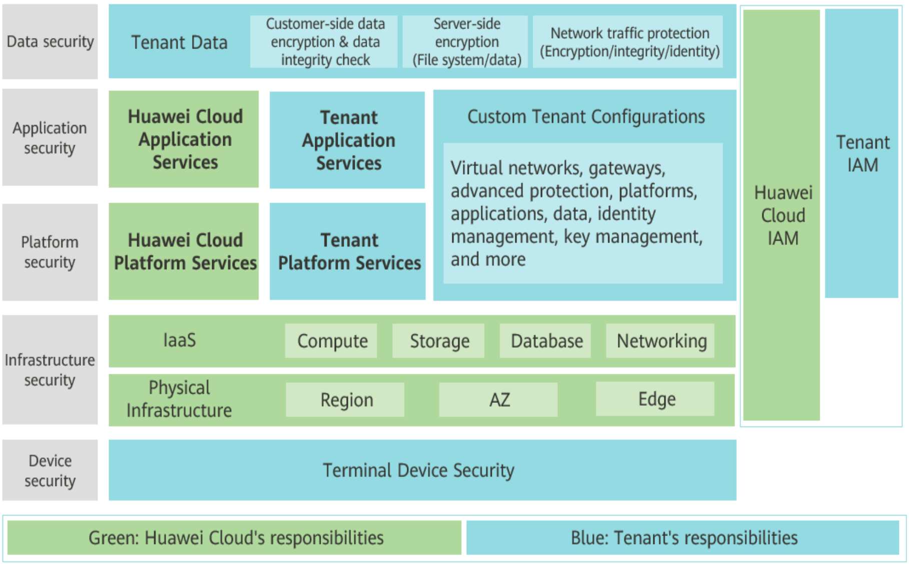
Figure 5-1 illustrates the responsibilities shared by Huawei Cloud and users.

- **Huawei Cloud**: Ensure the security of cloud services and provide secure clouds. Huawei Cloud's security responsibilities include ensuring the security of our IaaS, PaaS, and SaaS services, as well as the physical environments of the Huawei Cloud data centers where our IaaS, PaaS, and SaaS services operate. Huawei Cloud is responsible for not only the security functions and performance of our infrastructure, cloud services, and technologies, but also for the overall cloud O&M security and, in the broader sense, the security and compliance of our infrastructure and services.
- **Tenant**: Use the cloud securely. Tenants of Huawei Cloud are responsible for the secure and effective management of the tenant-customized configurations of cloud services including IaaS, PaaS, and SaaS. This includes

but is not limited to virtual networks, the OS of virtual machine hosts and guests, virtual firewalls, API Gateway, advanced security services, all types of cloud services, tenant data, identity accounts, and key management.

Huawei Cloud Security White Paper elaborates on the ideas and measures for building Huawei Cloud security, including cloud security strategies, the shared responsibility model, compliance and privacy, security organizations and personnel, infrastructure security, tenant service and security, engineering security, O&M security, and ecosystem security.

Figure 5-1 Huawei Cloud shared security responsibility model


Data security
Tenant Data
Customer-side data encryption & data integrity check
Server-side encryption (File system/data)
Network traffic protection (Encryption/integrity/identity)
Application security
Huawei Cloud Application Services
Tenant Application Services
Custom Tenant Configurations
Virtual networks, gateways, advanced protection, platforms, applications, data, identity management, key management, and more
Platform security
Huawei Cloud Platform Services
Tenant Platform Services
Infrastructure security
IaaS
Compute
Storage
Database
Networking
Physical Infrastructure
Region
AZ
Edge
Device security
Terminal Device Security
Huawei Cloud IAM
Tenant IAM
Green: Huawei Cloud's responsibilities
Blue: Tenant's responsibilities

5.2 Identity Authentication and Access Control

You can access CBR through the CBR console, APIs, or SDKs. No matter which method you choose, you actually use REST APIs to access CBR.

CBR APIs support only authenticated requests. You must obtain the authentication information from Huawei Cloud IAM before you can access CBR. For details about IAM authentication, see **Authentication**.

5.3 Data Protection

CBR takes many measures to keep data secure and reliable.

Table 5-1 CBR data protection

Measure	Description
Transmission encryption (HTTPS)	To ensure the transmission security, backup data is stored to OBS buckets via HTTPS.

Measure	Description
Storage data redundancy	CBR allows you to create multi-AZ backup vaults so that your backup data can be stored in multiple AZs of a region. If one AZ becomes unavailable, backup data can still be accessed from other AZs. This feature is suitable for data storage that requires high reliability. **NOTE** CBR storage data redundancy is implemented based on the redundancy storage technique of OBS. For details, see **What Redundancy Storage Techniques Does OBS Use?**
Backup data encryption	If a disk you want to back up is encrypted, the backups generated for this disk will also be encrypted. When such a backup is used to restore data, the encrypted data will first be decrypted and then restored to the target disk.
Cross-region replication	Cross-region replication allows you to automatically and asynchronously replicate backups from one region to a replication vault in a different region based on a replication policy. The cross-region disaster recovery capabilities it offers can cater to your needs for remote backup.

5.4 Auditing and Logging

Auditing

Cloud Trace Service (CTS) records operations on the Huawei Cloud resources in your account. You can use the logs generated by CTS to perform security analysis, track resource changes, audit compliance, and locate faults.

After you enable CTS and configure a tracker, CTS can record management and data traces of CBR for auditing.

For details about how to enable and configure CTS, see **CTS Getting Started**.

For the CBR management and data traces supported by CTS, see **Auditing**.

Logging

CBR shows tasks of critical operations on the web page. You can log in the CBR console, choose **Tasks** from the navigation page on the left, and view the task list in the right pane. Alternatively, you can **query the task list** via the API.

5.5 Resilience

CBR uses a multi-level reliability architecture and provides technical solutions, including cross-region replication, cross-AZ DR of backup data in the same region, and intra-AZ device and data redundancy to guarantee data durability and reliability.

CBR backup data is stored in OBS and enjoys 99.9999999999% durability, which is the same as that of OBS. For details, see **OBS durability**.

5.6 Risk Monitoring

Cloud Eye is a multi-dimensional monitoring platform that allows you to view the resource usages and service running status, and respond to exceptions in a timely manner for the smooth running of services.

CBR uses Cloud Eye to monitor your vaults and backups and receive alarms and notifications in real time. You can obtain your vault usage in real time and be notified for events, such as backup creation or deletion failures.

For details about supported CBR metrics and how to create alarm rules, see **Monitoring**.

5.7 Fault Recovery

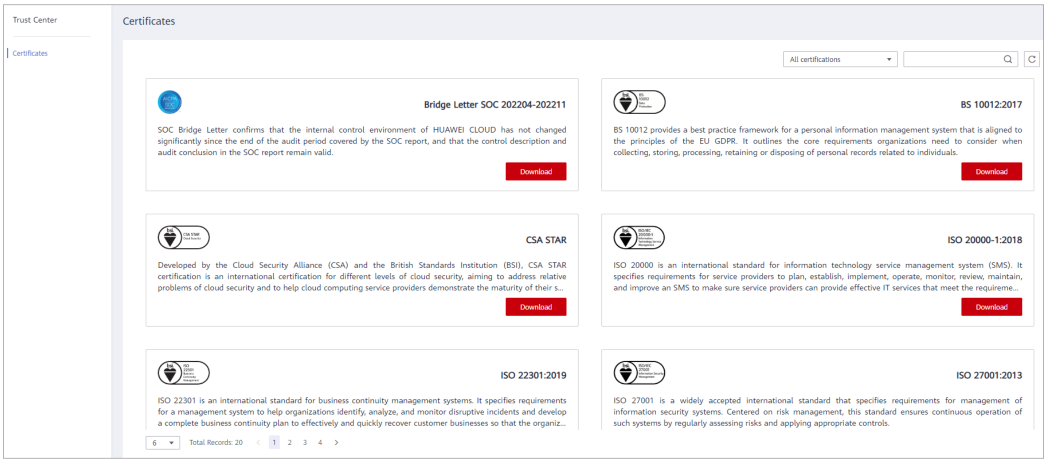
CBR allows you to back up and restore certain cloud resources, including ECSs, EVS disks, SFS Turbo file systems, and Workspace desktops. If any of these types of resources fail, you can use backups to restore to the source or new resources, thus quickly restoring data and services. For more information, see **Function Overview**.

5.8 Certificates

Compliance Certificates

Huawei Cloud services and platforms have obtained various security and compliance certifications from authoritative organizations, such as International Organization for Standardization (ISO). You can **download** them from the console.

Figure 5-2 Downloading compliance certificates



Bridge Letter SOC 202204-202211

SOC Bridge Letter confirms that the internal control environment of HUAWEI CLOUD has not changed significantly since the end of the audit period covered by the SOC report, and that the control description and audit conclusion in the SOC report remain valid.

BS 10012:2017

BS 10012 provides a best practice framework for a personal information management system that is aligned to the principles of the EU GDPR. It outlines the core requirements organizations need to consider when collecting, storing, processing, retaining or disposing of personal records related to individuals.

CSA STAR

Developed by the Cloud Security Alliance (CSA) and the British Standards Institution (BSI), CSA STAR certification is an international certification for different levels of cloud security, aiming to address relative problems of cloud security and to help cloud computing service providers demonstrate the maturity of their s...

ISO 20000-1:2018

ISO 20000 is an international standard for information technology service management system (SMS). It specifies requirements for service providers to plan, establish, implement, operate, monitor, review, maintain, and improve an SMS to make sure service providers can provide effective IT services that meet the requireme...

ISO 22301:2019

ISO 22301 is an international standard for business continuity management systems. It specifies requirements for a management system to help organizations identify, analyze, and monitor disruptive incidents and develop a complete business continuity plan to effectively and quickly recover customer businesses so that the organiz...

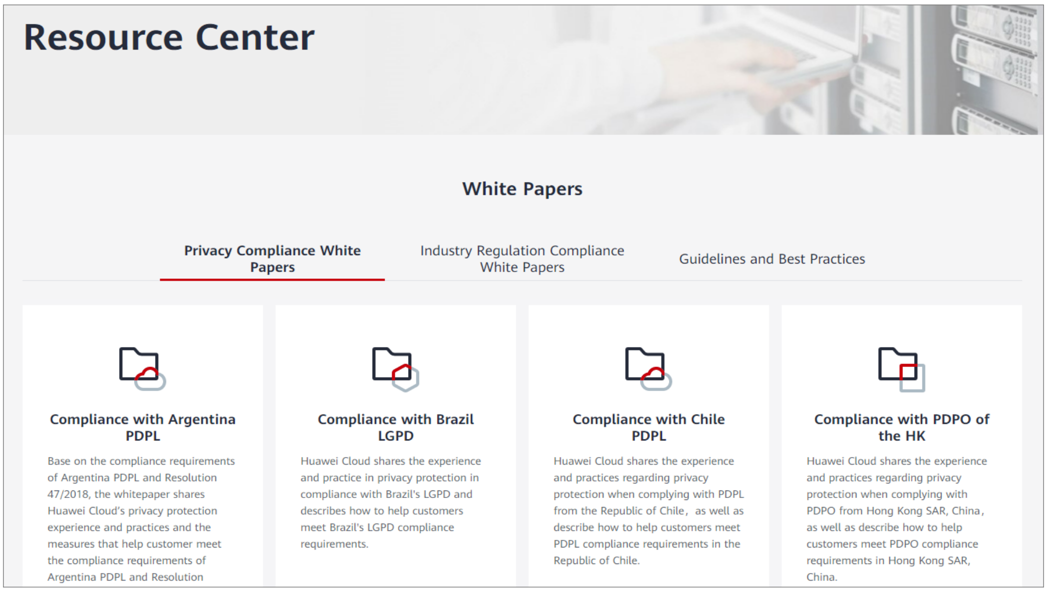
ISO 27001:2013

ISO 27001 is a widely accepted international standard that specifies requirements for management of information security systems. Centered on risk management, this standard ensures continuous operation of such systems by regularly assessing risks and applying appropriate controls.

Resource Center

Huawei Cloud also provides the following resources to help users meet compliance requirements. For details, see **Resource Center**.

Figure 5-3 Resource center



Resource Center

White Papers

Privacy Compliance White Papers
Industry Regulation Compliance White Papers
Guidelines and Best Practices

Compliance with Argentina PDPL

Base on the compliance requirements of Argentina PDPL and Resolution 47/2018, the whitepaper shares Huawei Cloud's privacy protection experience and practices and the measures that help customer meet the compliance requirements of Argentina PDPL and Resolution

Compliance with Brazil LGPD

Huawei Cloud shares the experience and practice in privacy protection in compliance with Brazil's LGPD and describes how to help customers meet Brazil's LGPD compliance requirements.

Compliance with Chile PDPL

Huawei Cloud shares the experience and practices regarding privacy protection when complying with PDPL from the Republic of Chile，as well as describe how to help customers meet PDPL compliance requirements in the Republic of Chile.

Compliance with PDPO of the HK

Huawei Cloud shares the experience and practices regarding privacy protection when complying with PDPO from Hong Kong SAR, China，as well as describe how to help customers meet PDPO compliance requirements in Hong Kong SAR, China.

5.9 Trusted Services

CBR will be enabled as a trusted service when a management account creates organizational policies. A trusted service has access to information about the organization units (OUs) and member accounts in the organization, and also has the capabilities for managing the entire organization.

6 Billing

Billing Items

You are billed for the storage space and optionally the data traffic required for backup replication. Pricing of the storage space varies with vault types. See details in the following table.

Table 6-1 CBR billed items

Category	Billed Item	Description	Billing Mode	Billing Formula
Storage capacity	Disk backup vault	If cloud disks need to be backed up, buy disk backup vaults to store the backups. Billing factor: storage capacity	Pay-per-use Yearly/Monthly	• Pay-per-use: Vault unit price per GB x Vault capacity x Purchased duration • Yearly/Monthly: See the **Product Pricing Details** page of CBR.
	Server backup vault	If cloud servers (without applications) need to be backed up, buy server backup vaults to store the backups. Billing factor: storage capacity	Pay-per-use Yearly/Monthly	
	SFS Turbo backup vault	If SFS Turbo file systems need to be backed up, buy SFS Turbo backup vaults to store the backups. Billing factor: storage capacity	Pay-per-use Yearly/Monthly	

Category	Billed Item	Description	Billing Mode	Billing Formula
	Database server backup vault	If cloud servers (with applications) need to be backed up, buy database server backup vaults to store the backups. You need to enable **Application-Consistent Backup** on the **Buy Server Backup Vault** page before using database server backup vaults. For more information, see **Application-Consistent Backup Overview**. Billing factor: storage capacity	Pay-per-use Yearly/ Monthly	
	Hybrid cloud backup vault	If backups of on-premises VMware VMs and OceanStor Dorado arrays need to be stored, buy hybrid cloud backup vaults. Billing factor: storage capacity	Pay-per-use Yearly/ Monthly	
	Desktop backup vault	If Workspace desktops need to be backed up, buy desktop backup vaults to store the backups. Billing factor: storage capacity	Pay-per-use Yearly/ Monthly	
	Replication vault	If you need to replicate backups to another region, buy replication vaults in the destination region. Billing factor: storage capacity	Pay-per-use Yearly/ Monthly	
	Dedicated vault	Customers using Dedicated Cloud can store their backup data in dedicated vaults. Billing factor: storage capacity	Pay-per-use Yearly/ Monthly	

Category	Billed Item	Description	Billing Mode	Billing Formula
Data traffic	Outbound traffic over the Internet	If hybrid cloud backups on the cloud are used to restore data to on-premises IDCs, outbound traffic is charged.	Limited-time free trial	Limited-time free trial
	Cross-region replication traffic	If backups or vaults are replicated to another region, traffic for cross-region replication is charged for the source region. Billing factor: storage capacity and traffic	Pay-per-use	Pay-per-use: Cross-region replication traffic x Unit price per GB

NOTE

For more information, see **CBR pricing details**.

Billing Modes

Two billing modes are available: pay-per-use and yearly/monthly. Select a billing mode that best suits your business needs.

- **Pay-per-use**

  You pay for the duration you use the resources. Prices are calculated by the hour, and no minimum fee is required.

- **Yearly/Monthly**

  Yearly/monthly is a prepaid billing mode. You are billed based on the subscription duration you specify. This mode is ideal when the resource use duration is predictable. A longer subscription often means a lower cost.

CBR also provides replication traffic packages for cross-region replication. If you do not have such a package, you will be billed per use.

For more information, see **CBR pricing details**.

Billing Examples

Example 1

Purchase a pay-per-use vault for cloud servers without databases deployed:

If a user purchases a 400-GB server backup vault for their 100-GB cloud server in the LA-Mexico City1 region, the user is billed for the 400-GB server backup vault in CBR.

Example 2

Purchase a pay-per-use vault for cloud servers with databases deployed:

If a user purchases an 800-GB database server backup vault for their 100-GB database server in the LA-Mexico City1 region, the user is billed for the 800-GB database server backup vault in CBR.

Example 3

Replicate a backup to another region:

If a user purchases a 100-GB server backup vault in the LA-Mexico City1 region and a 200-GB replication vault in the AP-Bangkok region and replicates 40 GB of data from the vault in LA-Mexico City1 to the vault in AP-Bangkok, the user is billed for the 100-GB backup vault, the 200-GB replication vault, and the traffic for replicating 40 GB of data.

Changing Billing Mode

- Yearly/monthly is a prepaid billing mode. You are billed based on the subscription duration you specify. This mode is ideal when the resource use duration is predictable. A longer subscription often means a lower cost.
- Pay-per-use is a postpaid billing mode. You are billed based on your resource usage and you can increase or delete resources any time.

If the resource use is stable, you can change a pay-per-use vault to a yearly/monthly vault to save more money. For details, see **Changing the Billing Mode from Pay-per-Use to Yearly/Monthly**.

Expiration

For details, see **Service Suspension and Resource Release**.

Renewal

Choose **More** > **Renew** in the **Operation** column of the yearly/monthly vault to renew your subscription. For more information about renewal, including auto-renewal, exporting the renewal history, and changing subscriptions, see **Renewal Management**.

Overdue Payment

Possible causes of overdue payment:

- Your configured payment method or top-up account cannot pay for the amount generated for you pay-per-use vaults.
- Your configured payment method or top-up account cannot pay for the generated replication traffic.

Service status and operation restrictions when an account is in arrears:

In the retention period, your vaults and backup data are retained. You can view existing backups but cannot create new backups or add tags. If you do not bring your account balance current before the retention period ends, your CBR resources will be released and data cannot be restored. For how to repay arrears, see **Top-Up and Repayment**.

For details about the retention period, see **Service Suspension and Resource Release**.

7 Permissions

If you need to assign different permissions to personnel in your enterprise to access your CBR resources, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you to securely access your Huawei Cloud resources.

With IAM, you can create IAM users and assign permissions to control their access to specific resources. For example, if you want some software developers in your enterprise to use CBR resources but do not want them to delete CBR resource or perform any other high-risk operations, you can create IAM users and grant permission to use CBR resources but not permission to delete them.

If your Huawei Cloud account does not require individual IAM users for permissions management, you can skip this section.

IAM is a free service. You only pay for the resources in your account. For more information about IAM, see **IAM Service Overview**.

CBR Permissions

New IAM users do not have any permissions assigned by default. You need to first add them to one or more groups and attach policies or roles to these groups. The users then inherit permissions from the groups and can perform specified operations on cloud services based on the permissions they have been assigned.

CBR is a project-level service deployed for specific regions. When you set **Scope** to **Region-specific projects** and select the specified projects in the specified regions, the users only have permissions for CBR resources in the selected projects. If you set **Scope** to **All resources**, the users have permissions for CBR resources in all region-specific projects. When accessing CBR resources, the users need to switch to the authorized region.

You can grant permissions by using roles and policies.

- Roles: A coarse-grained authorization strategy provided by IAM to assign permissions based on users' job responsibilities. Only a limited number of service-level roles are available for authorization. Huawei Cloud services depend on each other. When you grant permissions using roles, you also need to attach any existing role dependencies. Roles are not ideal for fine-grained authorization and least privilege access.

- Policies: A fine-grained authorization strategy that defines permissions required to perform operations on specific cloud resources under certain conditions. This type of authorization is more flexible and is ideal for least privilege access. For example, you can grant users only permission to manage ECSs of a certain type. A majority of fine-grained policies contain permissions for specific APIs, and permissions are defined using API actions. For the API actions supported by CBR, see **Permissions Policies and Supported Actions**.

Table 7-1 lists all the system-defined permissions for CBR.

Table 7-1 System-defined permissions for CBR

Policy Name	Description	Type
CBR FullAccess	Administrator permissions for CBR. Users with these permissions can operate and use all vaults, backups, and policies.	System-defined policy
CBR BackupsAndVaults-FullAccess	Common user permissions for CBR. Users with these permissions can create, view, and delete vaults and backups, but cannot create, update, or delete policies.	System-defined policy
CBR ReadOnlyAccess	Read-only permissions for CBR. Users with these permissions can only view CBR data.	System-defined policy

Table 7-2 lists the common operations supported by system-defined permissions of CBR.

Table 7-2 Common operations supported by system-defined permissions of CBR

Operation	CBR FullAccess	CBR BackupsAndVaultsFullAccess	CBR ReadOnlyAccess
Querying vaults	Supported	Supported	Supported
Creating vaults	Supported	Supported	Not supported
Listing vaults	Supported	Supported	Supported
Updating vaults	Supported	Supported	Not supported
Deleting vaults	Supported	Supported	Not supported
Associating resources	Supported	Supported	Not supported
Dissociating resources	Supported	Supported	Not supported
Creating policies	Supported	Not supported	Not supported

Operation	CBR FullAccess	CBR BackupsAndVaultsFullAccess	CBR ReadOnlyAccess
Updating policies	Supported	Not supported	Not supported
Applying policies to vaults	Supported	Supported	Not supported
Removing policies from vaults	Supported	Supported	Not supported
Deleting policies	Supported	Not supported	Not supported
Synchronizing backups	Supported	Supported	Not supported
Replicating vaults	Supported	Supported	Not supported
Performing backups	Supported	Supported	Not supported
Updating subscriptions	Supported	Supported	Not supported
Querying the Agent status	Supported	Supported	Not supported
Deleting backups	Supported	Supported	Not supported
Restoring data from backups	Supported	Supported	Not supported
Replicating backups	Supported	Supported	Not supported
Associating vaults	Supported	Supported	Not supported
Batch adding or deleting vault tags	Supported	Supported	Not supported
Adding vault tags	Supported	Supported	Not supported
Editing tags	Supported	Supported	Not supported

Roles or Policies that the CBR Console Depends on

Table 7-3 Roles or policies that the CBR console depends on

Console Function	Dependent Services	Roles or Policies Required
Associating ECSs with a vault	ECS	When an IAM user associates ECSs with a vault on the CBR console, the permissions of querying the ECS list and details are required. The user can either use the **CBRFullAccessPolicy** policy or add the required actions to a custom policy. Required actions: ecs:cloudServers:listServerVolumeAttachments ecs:cloudServers:list ecs:cloudServers:showServer
Associating EVS disks with a vault	EVS	When an IAM user associates EVS disks with a vault on the CBR console, the permissions of querying the EVS disk list and details are required. The user can either use the **CBRFullAccessPolicy** policy or add the required actions to a custom policy. Required actions: evs:volumes:list
Associating SFS Turbo file systems with a vault	SFS Turbo	When an IAM user associates SFS Turbo file systems with a vault on the CBR console, the permissions of querying the SFS Turbo file system list and details are required. The user can either use the **CBRFullAccessPolicy** policy or add the required actions to a custom policy. Required actions: sfsturbo:shares:getAllShares
Associating Workspace desktops with a vault	WorkSpace	When an IAM user associates Workspace desktops with a vault on the CBR console, the permissions of querying the Workspace desktop list and details are required. The user can either use the **CBR FullAccess** policy or add the following actions to a custom policy: workspace:desktops:listDetail vpc:securityGroups:get vpc:publicIps:list vpc:ports:get

Console Function	Dependent Services	Roles or Policies Required
Querying a backup and registering an image	IMS	When an IAM user uses a cloud server backup to create a private image on the CBR console, the permission of querying the image list is required. The user can either use the **CBRFullAccessPolicy** policy or add the required actions to a custom policy. Required actions: ims:images:list

Helpful Links

- **IAM Service Overview**
- **Creating a User Group and User and Granting CBR Permissions**
- **Permissions Policies and Supported Actions**

8 Constraints

General

- A vault can be associated with only one backup policy.
- A vault can be associated with only one replication policy.
- A vault can be associated with a maximum of 256 resources.
- A maximum of 32 backup policies and 32 replication policies can be created.
- Only backups in the **Available** or **Locked** vaults can be used to restore data.
- Backups in a **Deleting** vault cannot be deleted.
- Backups cannot be downloaded to a local PC or uploaded to OBS.
- A vault and its associated servers or disks must be in the same region.
- Concurrent data restoration is not supported.
- Auto capacity expansion does not take effect if it is enabled after the vault is full.

Cloud Disk Backup

- Only disks in the **Available** or **In-use** state can be backed up.
- Frozen disks in the retention period cannot be backed up.
- A new disk must be at least as large as the backup's source disk.
- Cloud disk backups cannot be replicated to other regions.
- Backup and restoration of local disks are not supported.

Cloud Server Backup

- A maximum of 10 shared disks can be backed up with a cloud server.
- Only backups in the **Available** or **Locked** vaults can be used to create images and be replicated to different regions.
- Frozen servers in the retention period cannot be backed up.
- Cloud servers support crash-consistent backup, whereas database servers support application-consistent backup in addition to crash-consistent backup.
- You can back up specific disks on a server, but such a backup must be restored as a whole. File- or directory-level restoration is not supported.

- Images cannot be created from backups if the amount of resources associated with a server backup vault exceeds the quota.
- You are advised not to back up a server whose disk size exceeds 4 TB.
- Backups can be replicated only to regions that have replication capabilities.
  - A backup can be replicated only when it meets all of the following conditions:
    i. It is an ECS backup.
    ii. It contains system disk data.
    iii. It is in the **Available** state.
  - Only backups can be replicated. Backup replicas cannot be replicated again but can be used to create images.
  - A backup can be replicated to multiple regions but can have only one replica in each destination region. The replication rule varies with the replication method:
    - Manual replication: A backup can be replicated to the destination region as long as it has no replica in that region. A backup can be replicated again if its replica in the destination region has been deleted.
    - Policy-based replication: A backup can only be automatically replicated to a destination region once. It cannot be automatically replicated to that region again, even if its replica has been deleted.
  - Only replication-supported regions can be selected as destination regions.

SFS Turbo Backup

- Only file systems in the **Available** state can be backed up.
- An SFS Turbo file system backup cannot be used to restore data to the original file system.
- Backups can be replicated only to regions that have replication capabilities.
  - A backup can be replicated only when it meets all of the following conditions:
    i. It is generated for an SFS Turbo file system.
    ii. It is in the **Available** state.
  - Only backups can be replicated. Backup replicas cannot be replicated again but can be used to create SFS Turbo file systems.
  - A backup can be replicated to multiple regions but can have only one replica in each destination region. The replication rule varies with the replication method:
    - Manual replication: A backup can be replicated to the destination region as long as it has no replica in that region. A backup can be replicated again if its replica in the destination region has been deleted.
    - Policy-based replication: A backup can only be automatically replicated to a destination region once. It cannot be automatically replicated to that region again, even if its replica has been deleted.

  - Only replication-supported regions can be selected as destination regions.

Hybrid Cloud Backup - Storage Backup

- See **OceanStor Dorado V3 Series V300R002 CloudBackup Feature Guide** for the constraints on storage devices.
- Backups synchronized to the cloud cannot be used to create cloud servers.
- Synchronized backups can only be restored to data disks on cloud servers.

Hybrid Cloud Backup - VMware Backup

- VM backups from the following VMware vSphere versions can be restored to cloud servers: 5.1, 5.5, 6.0, 6.5. If you do not need to restore the backups to cloud servers, there is no restriction on the VMware version.
- To obtain better performance and operation experience, you are advised to use the OSs listed in **Table 8-1**, which have passed the compatibility test.
- The VDDK version of VMware 6.5 VMs must be 6.0.3.
- Backups synchronized to the cloud cannot be used to create cloud servers.
- Backups synchronized to the cloud can only be restored to other cloud servers, and can be restored to system disks or data disks.
- Before the restoration, configure security groups according to the procedure. Otherwise, the restoration may fail.

Table 8-1 OSs that support restoration to the cloud

OS	Supported Version
Windows	Windows 7 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Windows Server 2016 Windows Server 2019
CentOS	CentOS 6.4 CentOS 6.5 CentOS 7.2 CentOS 7.3 CentOS 7.4 CentOS 7.5 CentOS 7.6 CentOS 7.7
Red Hat	Red Hat 6.4 Red Hat 6.5 Red Hat 7.2

Desktop Backup

- Only desktops in the **Available** or **In-use** state can be backed up.

File Backup

- Before backing up a file, ensure that the file is not being used or changed by an application, and the backup client has the read permissions on this file. Otherwise, the backed-up data will be incomplete.
- Before backing up a file, ensure that the file is not being used or changed by a process, and the backup client has the read permissions on this file. Otherwise, the backed-up data will be incomplete.
- You are advised not to restore file backups when applications are running. Stop the applications and then restore files.
- One backup client can have a maximum of 8 files and directories added.
- Each resource can only have one Agent installed.
- The number of resources where the Agent can be installed is not limited.
- A single directory can contain a maximum of 500,000 files, and you are advised to reserve at least 4 GB of memory on each backup client to perform file backups.
- One path can contain a maximum of 200 characters.
- The maximum bandwidth allowed for file backup data transmission is 16 Gbit/s. If the maximum bandwidth is reached, flow control will be triggered.
- File backup cannot back up the files stored in SFS file systems that are mounted to cloud servers.
- Backup may fail on directories with frequent file writes in Windows.
- At least 50 Mbit/s network bandwidth is required in cross-cloud or cross-region scenarios.

Application-Consistent Backup

Table 8-2 OSs that support installation of the Agent

Database	OS	Version
SQL Server 2008/2012/2019	Windows	Windows Server 2008, 2008 R2, 2012, 2012 R2, and 2019 for x86_64
SQL Server 2014/2016/ Enterprise Edition	Windows	Windows Server 2014, 2014 R2, and 2016 Datacenter for x86_64
MySQL 5.5/5.6/5.7	Red Hat	Red Hat Enterprise Linux 6 and 7 for x86_64
	SUSE	SUSE Linux Enterprise Server 11, 12, 15 SP1, 15 SP2 for x86_64
	CentOS	CentOS 6 and 7 for x86_64

Database	OS	Version
	EulerOS	EulerOS 2.2 and 2.3 for x86_64
HANA 1.0/2.0	SUSE	SUSE Linux Enterprise Server 12 for x86_64

9 CBR and Other Services

CBR-related Services

Table 9-1 CBR-related services

Function	Related Service	Reference
CBR backs up data of an ECS and uses the backup to restore data for the ECS. You can also create images from ECS backups and use the images to quickly provision ECSs to restore services.	ECS	**Creating a Cloud Server Backup** **Creating a Cloud Disk Backup**
CBR backs up data of a BMS and uses the backup to restore data for the BMS. The backup and management processes for BMSs and ECSs are the same.	BMS	**What Is CBR?** **Creating a Cloud Server Backup**
CBR backs up data of SFS Turbo file systems and uses the backup to create new file systems to restore lost or corrupted data.	SFS	**Creating an SFS Turbo Backup**
CBR backs up data of Workspace desktops and uses the backup to restore lost or corrupted data.	Workspace	**Creating a Desktop Backup**
CBR stores backups securely in OBS.	OBS	**What Is CBR?**
CBR backs up data of EVS disks and uses the backup to create new disks.	EVS	**Creating a Cloud Disk Backup**
Cloud Trace Service (CTS) records operations on CBR resources, facilitating future queries, audits, and backtracking.	CTS	**Auditing**

Function	Related Service	Reference
Data Express Service (DES) allows you to easily migrate massive amount of data to the cloud. After a VMware VM is backed up on-premises, you can use DES Teleports or disks to transmit the backup data to an OBS bucket. Then you can synchronize the backup data from the OBS bucket to a CBR vault.	DES	**Creating a Storage Unit**
IAM is a self-service system for enterprise administrators to manage cloud resources. It provides user identity management and access control functions. When multiple users within an enterprise need to use CBR, the enterprise administrator can use IAM to create IAM users and control these users' access to CBR resources.	IAM	**7 Permissions**
Tag Management Service (TMS) enables you to add preset tags to CBR vaults to facilitate vault management.	TMS	**Managing Vault Tags**

10 Basic Concepts

10.1 CBR Concepts

Vault

CBR stores backups in vaults. Vaults can be either backup vaults or replication vaults.

- Backup vaults store backups of a variety of resources, including servers and disks, and are classified into the following types:
  - **Server backup vaults**: store backups of non-database servers or database servers. You can associate servers with a server backup vault and apply a backup or replication policy to schedule automatic backups or replications.
  - **Disk backup vaults**: store only disk backups. You can associate disks with a disk backup vault and apply a backup policy to schedule automatic backups.
  - **SFS Turbo backup vaults**: store only backups of SFS Turbo file systems. You can associate file systems with an SFS Turbo backup vault and apply a backup policy to schedule automatic backups.
  - **Hybrid cloud backup vaults**: store backups synchronized from the on-premises OceanStor Dorado storage systems and VMware VMs. You can replicate backups to a replication vault in a different region and restore data to other servers. Hybrid cloud backup vaults can also store backups of files and directories on your cloud servers and on-premises hosts.
  - **Desktop backup vaults**: store only backups of Workspace desktops. You can associate desktops with a desktop backup vault and apply a backup policy to schedule automatic backups.

- Replication vaults store only replicas of backups, and such replicas cannot be replicated again. Replication vaults that store replicas of server backups include those for non-database servers and those for database servers.

Backup

A backup is a copy of a particular chunk of data and is usually stored elsewhere so that it may be used to restore the original data in the event of data loss. It can be generated either manually by a one-off backup task or automatically by a periodic backup task.

A one-off backup task is manually created and is executed only once. Periodic backup tasks are automatically executed based on a user-defined backup policy.

- A one-off backup is named **manualbk_***xxxx* and can be user- or system-defined.
- A periodic backup is named **autobk_***xxxx* by CBR.

Backup Policy

A backup policy is a set of rules that define the schedule and retention of backups. After you apply a backup policy to a vault, CBR automatically backs up data and retains backups based on that backup policy.

Replication

Replication is the process of replicating backups from one region to another. You can use the replicas in the destination region to create images and provision servers.

You can manually replicate a single cloud server backup or a hybrid cloud backup. You can also configure replication rules in a policy to periodically replicate backups, including those have not been replicated or failed to be replicated to the destination region.

For example, if you want to back up a server, select **Backup** for the vault protection type. If you want to replicate backups of this server to a different region, select **Replication** for the vault in this different region.

Instant Restore

Instant Restore restores data and creates images from backups, much faster than a normal restore.

Instant Restore is an enhanced function of CBR and requires no additional configuration. After Instant Restore is provided, you take less time to restore server data or create images.

Enhanced Backup

Enhanced backups are backups generated after Instant Restore is provided. Enhanced backups make it faster to restore server data or create images.

Before providing Instant Restore, CBR generates common backups. After providing Instant Restore, CBR first performs a full backup for each associated resource and then generates enhanced backups. CBR only generates enhanced backups currently.

For the same resource, an enhanced backup and a common backup have the same backup content and size. They only differ in the restoration speed.

Application-Consistent Backup

There are three types of backups in terms of backup consistency:

- Inconsistent backup: An inconsistent backup contains data taken from different points in time. This typically occurs if changes are made to your files or disks during the backup.
- Crash-consistent backup: A crash-consistent backup captures all data on disks at the time of the backup and does not capture data in memory or any pending I/O operations. Although it cannot ensure application consistency, disks are checked by **chkdsk** upon operating system restart to restore damaged data and undo logs are used by databases to keep data consistent.
- Application-consistent backup: An application-consistent backup captures data in memory or any pending I/O operations and allows applications to achieve a quiescent and consistent state.

CBR cloud server backup supports both crash-consistent backup and application-consistent backup (also called database server backup). Install the Agent before enabling application-consistent backup to prevent the database server backup from failing.

Periodic Full Backup

CBR by default performs a full backup for a resource in the initial backup and incremental backups in all subsequent backups.

CBR now allows for periodic full backups in addition to the initial backup. You can configure a policy to perform a full backup after every N incremental backups. This further improves backup data security and meets periodic full backup needs.

Periodic full backups occupy more storage space than incremental backups.

10.2 Project and Enterprise Project

Project

A project is used to group and isolate OpenStack resources, such as the compute, storage, and network resources. A project can be a department or a project team. Multiple projects can be created for one account.

Enterprise Project

An enterprise project manages multiple resource instances by category. Resources and projects in different cloud service regions can be classified into one enterprise project. An enterprise can classify resources based on department or project group and put relevant resources into one enterprise project for management. Resources can be migrated between enterprise projects.

10.3 Region and AZ

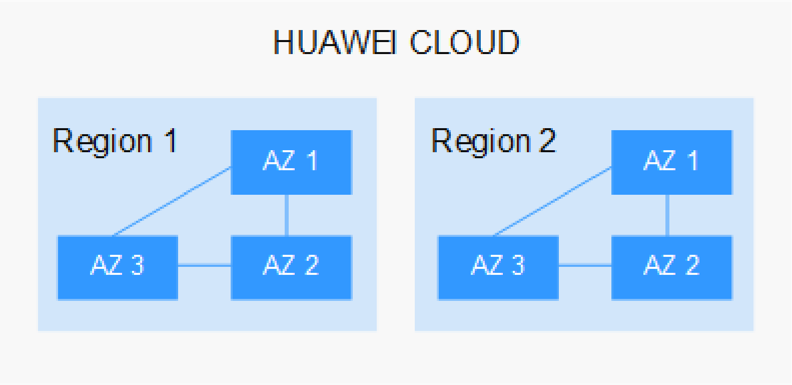
Concept

A region and availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- Regions are divided based on geographical location and network latency. Public services, such as Elastic Cloud Server (ECS), Elastic Volume Service (EVS), Object Storage Service (OBS), Virtual Private Cloud (VPC), Elastic IP (EIP), and Image Management Service (IMS), are shared within the same region. Regions are classified into universal regions and dedicated regions. A universal region provides universal cloud services for common tenants. A dedicated region provides specific services for specific tenants.
- An AZ contains one or more physical data centers. Each AZ has independent cooling, fire extinguishing, moisture-proof, and electricity facilities. Within an AZ, computing, network, storage, and other resources are logically divided into multiple clusters. AZs within a region are interconnected using high-speed optical fibers, to support cross-AZ high-availability systems.

Figure 10-1 shows the relationship between regions and AZs.

Figure 10-1 Regions and AZs



Huawei Cloud provides services in many regions around the world. You can select a region and an AZ based on requirements. For more information, see **Huawei Cloud Global Regions**.

Selecting a Region

When selecting a region, consider the following factors:

- Location

  It is recommended that you select the closest region for lower network latency and quick access.

  - If your target users are in Asia Pacific (excluding the Chinese mainland), select the **CN-Hong Kong**, **AP-Bangkok**, or **AP-Singapore** region.
  - If your target users are in Africa, select the **AF-Johannesburg** region.

  - If your target users are in Latin America, select the **LA-Santiago** region.

    NOTE

    The **LA-Santiago** region is located in Chile.

- Resource price

  Resource prices may vary in different regions. For details, see **Product Pricing Details**.

Selecting an AZ

When deploying resources, consider your applications' requirements on disaster recovery (DR) and network latency.

- For high DR capability, deploy resources in different AZs within the same region.
- For lower network latency, deploy resources in the same AZ.

Regions and Endpoints

Before you use an API to call resources, specify its region and endpoint. For more details, see **Regions and Endpoints**.

11 Change History

Released On	Description
2023-12-29	This issue is the seventh official release. Updated the following content: Added the description about the roles or policies that the CBR console depends on.
2023-03-24	This issue is the seventh official release. Updated the following content: Added section "CBR Infographics."
2022-07-20	This issue is the sixth official release. Updated the following content: Added support for file backup.
2021-10-27	This issue is the fifth official release. Updated the following content: Added the content of permissions management.
2020-08-07	This issue is the fourth official release. Updated the following content: Added the description of overdue payment in section "Billing."
2020-04-08	This issue is the third official release. Updated the following content: Added the content of file system backup.
2020-03-31	This issue is the second official release. Updated the following content: Added section "Billing."
2019-07-31	This issue is the first official release.