

# Content Delivery Network

## Best Practices

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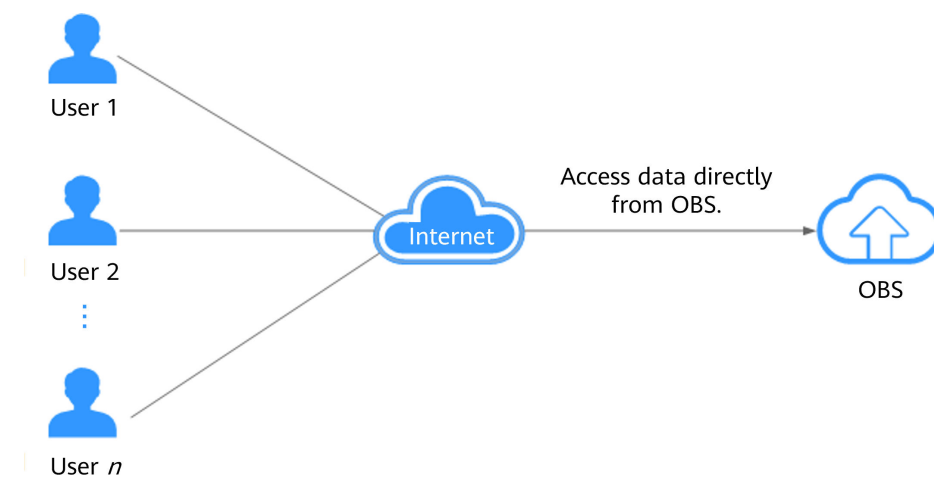
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# 1 Accelerating Delivery of OBS Resources

## 1.1 Solution Overview

### Background

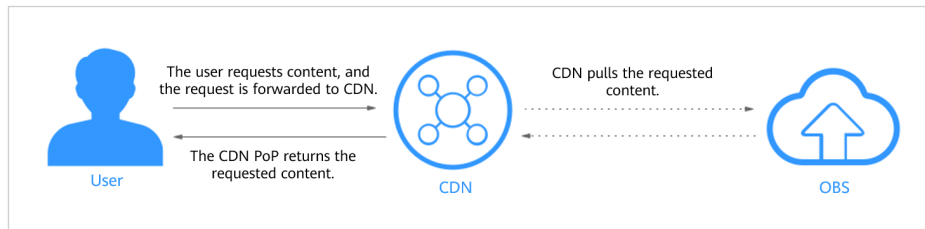
More and more companies in different industries use OBS buckets to store static resource files such as images, videos, and software packages. They use the OBS buckets as the storage source for websites, forums, apps, and games. Users can directly request these static resources from OBS using URLs. OBS buckets can solve the problem of insufficient local storage. However, the response speeds for users accessing OBS buckets in other regions are different, since files are generally stored in only one region. In scenarios where frequent access is required, accessing OBS buckets to obtain files consumes a large amount of traffic.



### Solution

Huawei Cloud CDN can effectively accelerate distribution of website resources to deliver a better user experience. OBS buckets can store massive numbers of files. Storing data in OBS buckets and using CDN for service acceleration can both reduce costs and improve user experience. When a user initiates an access request, CDN checks whether the content requested by the user is cached on the CDN

point of presence (PoP) with the fastest response speed. If a CDN PoP has cached the content, it directly returns the content to the user. If the CDN PoP does not cache the content, it pulls the content from the origin server, returns the content to the user, and caches the content.



## Resources and Costs

The following table lists the resources required for this practice.

Resource	Description	Monthly Fee
CDN	<b>Traffic/Bandwidth:</b> traffic/ bandwidth generated when users access CDN PoPs. You can purchase traffic packages to deduct the traffic when you are billed by traffic.	For billing details, see <a href="#">Billing</a> .
OBS	<b>Traffic:</b> outgoing Internet traffic generated when CDN pulls content from OBS, billed in pay-per-use mode. If you set the origin server type to <b>OBS bucket</b> and select a bucket of version 3.0 or later, you can purchase pull traffic packages to deduct the traffic.	For details about OBS billing modes and standards, see .

## Solution Advantages

- Low costs
  - Content in an OBS bucket with CDN acceleration enabled will be cached on CDN PoPs. CDN PoPs do not need to pull the content from the bucket when users request the content. The cost of CDN acceleration is low. With CDN acceleration, you can reduce bandwidth costs by 50% to 57%.

### NOTE

OBS buckets for CDN acceleration cannot be accessed through the intranet.

- High efficiency
  - Huawei Cloud CDN has abundant acceleration resources and widely distributed PoPs. It ensures that user requests are precisely scheduled to the optimal PoP for stable acceleration.

## Scenarios

- Applications or services that provide download services via HTTP/HTTPS through OBS, for example, websites that provide download services based on HTTP or HTTPS, download tools, game clients, app stores.
- Applications or services that provide audio on demand (AOD) or video on demand (VOD) services through OBS. On-demand services include online education, video sharing, music or video on demand, and other audiovisual content.
- Websites or applications that provide image materials through OBS, for example, portal websites, e-commerce platforms, news apps, and user-generated content (UGC) applications.

## Limitations and Constraints

- This solution applies only to OBS buckets whose version is 3.0 or later. You can view the bucket version in the **Basic Information** area on OBS Console.
- When back-to-source by mirroring is configured on OBS and range requests are enabled on CDN, if the mirror origin server does not comply with the RFC Range Requests standard, the response to range requests is not 206 and CDN fails to pull content. In this case, submit a service ticket.
- If the origin server type is set to **OBS bucket** and the origin server is an OBS private bucket, file upload is not supported. To use CDN to upload files to the OBS private bucket, set the origin server type to **Domain name** and enter the domain name of the private bucket when adding a domain name to CDN. In addition, force clients to carry the authentication header in requests for uploading files.

### NOTE

After an OBS private bucket is connected to CDN using the bucket domain name, clients cannot access the acceleration domain name because CDN does not have the permission to upload files to the bucket. Therefore, when GET or HEAD is used to request resources from the acceleration domain name, the authentication header must also be carried.

## Accelerating Downloads of Files Encrypted by KMS

By default, CDN cannot read encrypted files in OBS buckets. If such files exist in your OBS bucket, enabling CDN acceleration may cause leakage of encrypted objects. If you need to accelerate downloads of files encrypted by KMS in your OBS bucket due to service requirements, pay attention to the following:

- If your OBS bucket is a public bucket, CDN cannot read files encrypted by KMS in the bucket. As a result, the retrieval fails and users cannot access the encrypted files.

Solution: Move the encrypted files from the bucket to a private bucket, and then configure CDN acceleration for the private bucket.

- If your OBS bucket is a private bucket, assign the **kms:cmk:get** and **kms:dek:crypto** policies to the CDNAccessPrivateOBS agency. In this way, CDN can read and accelerate downloads of files encrypted by KMS in the bucket. For details, see [OBS Authorization](#).

## 1.2 Configuration Process

### Background

A game website mainly serves users in the Chinese mainland. It has a large number of files such as software packages and pictures stored on OBS. As the number of users increased, game downloading and image loading became slower, especially for users who are far away from the file storage area. To address this issue, the website decided to use the CDN service to accelerate game downloads at the lowest cost and improve user experience.

### Required Data

Item	Description	Example
Domain name	Domain name of the game website. If the service area of your website is Chinese mainland or global, the domain name <b>must be licensed by the Ministry of Industry and Information Technology (MIIT) and the license has not expired</b> , according to China's Internet Management Regulations. Otherwise, CDN cannot provide the acceleration service for the domain name.	download.game-apk1.com (licensed)
OBS bucket	The OBS bucket version is 3.0 or later, the bucket policy is public read, and static website hosting is not enabled.	obs-doc-test

### Procedure

1. Store static resources such as images and software packages of the website in the prepared OBS bucket. You can create a bucket and upload files using OBS Console, OBS Browser, or SDK. For details, see [OBS documentation](#).
2. Add a domain name on CDN.
  - a. Log in to [Huawei Cloud console](#). Choose **Service List > Content Delivery & Edge Computing > Content Delivery Network**.  
The CDN console is displayed.



- b. In the navigation pane, choose **Domains**.
- c. On the **Domains** page, click **Add Domain Names**.
- d. Configure the domain name and CDN acceleration information.
  - **Service Area**: Select **Chinese mainland**.
  - **Domain Names**: Enter **download.game-apk1.com**. If you add this domain name to CDN for the first time, verify its ownership.
  - **Service Type**: Select **File download**.
  - **Origin Server Settings**
    - **Origin Protocol**: Select **Same as user**.
    - **Type**: Select **OBS bucket**.
    - **Address**: Select the **obs-doc-test** bucket.
    - **Static website hosting**: Do not select this option.
    - **Bucket**: Select **Public bucket**.
    - **Priority**: Select **Primary origin server**.
    - **Host Header**: By default, the bucket domain name is used.

 **NOTE**

- If you use an OBS bucket created after January 1, 2022 as the origin server and want to enable online preview, log in to the CDN console, choose **Domains** in the navigation pane, click the target domain name, click the **Advanced Settings** tab, click **Edit** next to **HTTP Headers**, and set **Content-Disposition** to **inline**. For details, see [How Do I Preview Objects in OBS in a Browser Online?](#)

- e. Click **OK**.
3. Configure a CNAME record on DNS.

After the domain name is added, CDN automatically generates a CNAME for the domain name. The CNAME cannot be accessed directly. You must add it to your domain's DNS records. Then requests for your domain name will be redirected to CDN PoPs for acceleration. In this practice, the automatically generated CNAME is **download.game-apk1.com.\*\*\*.cdnhwcedi10.com**. The CNAME configuration method varies depending on the DNS provider. In this document, DNS provided by Huawei Cloud is used as an example. For details about how to configure CNAME records on other DNS providers, see [Configuring a CNAME Record](#).

- a. In the upper left corner of [Huawei Cloud console](#), choose **Service List > Networking > Domain Name Service**.  
The DNS console is displayed.
- b. In the navigation pane, choose **Public Zones**.  
The public zone list is displayed.
- c. Click the domain name you want to add a record set to. In this practice, the domain name is **game-apk1.com**.
- d. Click **game-apk1.com**. On the displayed page, click **Add Record Set** in the upper right corner. The **Add Record Set** dialog box is displayed.
- e. Set the parameters as prompted. Use the default values for the parameters that are not listed in the following table.

Parameter	Description	Example
Name	Domain name prefix.	download
Type	Type of the record set.	CNAME – Map one domain to another
Line	Resolution line. The DNS server will return the IP address of the specified line based on the source of visitors. You must add a <b>Default</b> line to ensure that the website is accessible to users of all carriers.	Default
TTL (s)	Cache duration of the record set on a local DNS server. If your service address changes frequently, set <b>TTL</b> to a smaller value.	5 min
Value	Domain name to be pointed to. If CDN acceleration is not enabled, the value is the bucket domain name. If CDN acceleration is enabled, the value is the CNAME generated by CDN.	download.game-apk1.com.***.cdnhwce di10.com

- f. Click **OK**.
4. Check whether the CNAME record has taken effect.  
Open the Windows command line interface and run the following command:  
`nslookup -qt=cname User-defined domain name bound to the bucket`  
In this practice, the user-defined domain name bound to the bucket is **download.game-apk1.com**. If the CNAME generated by CDN is displayed, the CNAME configuration has taken effect.
5. Configure the file download URL.  
Set the URL of the file to be downloaded in the code as follows: **Domain name of the game website + Storage path of the file in the OBS bucket + File name**.  
In the following example, the game website's domain name **download.game-apk1.com** and the **android.apk** file under the **game/3.2.1/** folder in the **obs-doc-test** bucket are used. Then the file download URL is as follows:  
`https://download.game-apk1.com/game/3.2.1/android.apk`
6. Verify the services.  
After the game website is redeployed, log in to the website, browse web pages, and download games.

If images are displayed properly and the games are downloaded successfully, the acceleration configuration is successful.

## 1.3 Configuring a Policy for a Custom OBS Private Bucket

If you use a custom OBS private bucket as the CDN origin server, that is, use an OBS private bucket under another account as the origin server, you need to configure a policy for the private bucket on OBS Console.

### Procedure

1. In the navigation pane of **OBS Console**, choose **Object Storage**.
2. In the bucket list, click the name of the bucket to be operated.  
The **Objects** page of the bucket is displayed.
3. In the navigation pane, choose **Permissions** > **Bucket Policy**.
4. Click **Create Bucket Policy**.
5. In the first row of the template list, click **Create Custom Policy** on the right.
  - **Policy View:** Select **Visual editor**.
  - **Policy Name:** Enter a name.
  - **Policy Content:** Select **Allow**.



6. Configure authorized users.
  - **Principal:** Select **Other account**.
  - **Account ID:** Enter the ID of the account that uses CDN acceleration.
  - **IAM User ID:** Enter the ID of an IAM user under another account if you only want to grant permissions to this IAM user. If no IAM user is configured, enter \*.
  - **User Policy:** Select **Include specified users**.

7. Configure resources.
  - **Resource:** Select the current bucket or objects in the bucket.
8. Configure actions.
  - Select the action to be authorized. The asterisk (\*) indicates all actions.
9. On the **Confirm Policy** page, click **Create**.
10. Click the edit icon on the right of the created bucket policy and click the **JSON** tab.
  - Change **domain/Account ID:user/User ID** in **Policy Content** to **domain/Account ID:agency/\***.

Policy Content

```

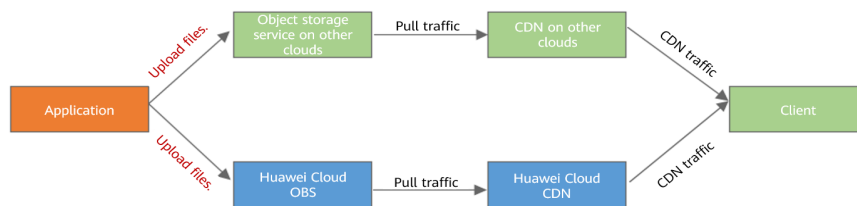
{
  "Statement": [
    {
      "Sid": "001",
      "Effect": "Allow",
      "Principal": {
        "ID": [
          "domain/0a0t",
          "1373:user/0a0t",
          "373"
        ]
      },
      "Action": [
        "Get*"
      ],
      "Resource": [
        "f-1"
      ]
    }
  ]
}
    
```

11. Click **Next** and then **Yes** to complete the configuration.

## 1.4 Synchronizing Data Stored on Multiple Clouds

### Dual-write

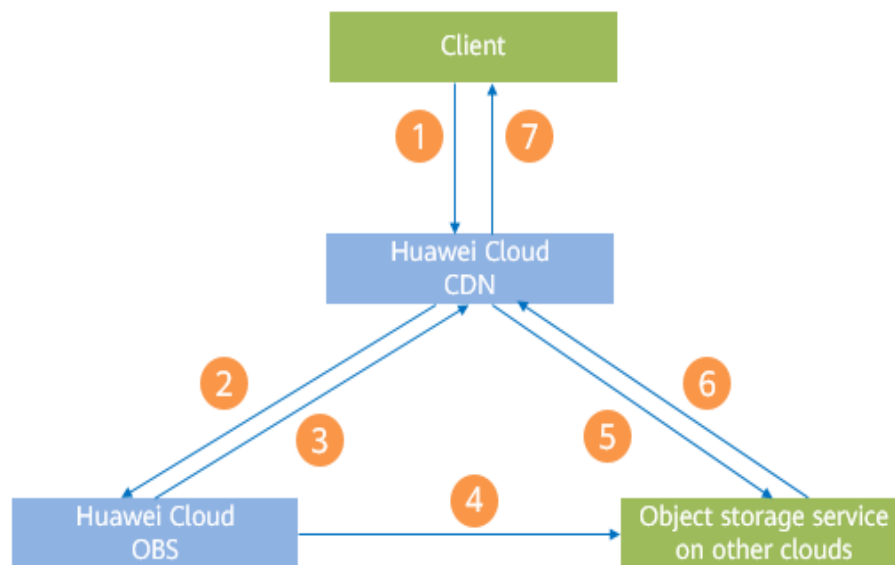
If data is generated on an application or generated on a client but written to an object storage service through a server, the dual-write solution is recommended. The following figure shows the architecture.



Applications can interconnect with SDKs of two object storage services to write files to the two object storage systems in synchronous or asynchronous mode. The upstream traffic of object storage services is free of charge. Therefore, using this architecture does not increase any cost.

## Back to Source

If an OBS bucket does not have a requested file, enable the back-to-source function to redirect the client request to the configured origin server. The data will be asynchronously obtained from the origin server and stored on Huawei Cloud Object Storage Service (OBS).



The procedure is as follows:

1. A client requests a file from CDN.
2. CDN pulls the requested file from OBS.
3. CDN receives an HTTP status code 302 from OBS if the requested file does not exist.
4. OBS asynchronously requests the file from the configured origin server (third-party object storage service).
5. CDN follows the redirect to obtain data from the third-party object storage service.
6. The third-party object storage service responds to the file request from CDN.

- 7. CDN returns the requested file to the client. When the client requests the same file next time, CDN directly fetches the file from OBS.

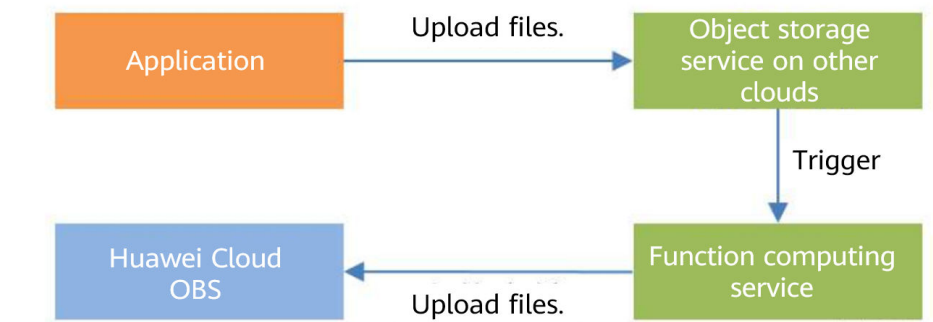
**NOTE**

The back-to-source function is triggered only when OBS initiates a request. Therefore, after a new file is uploaded to another object storage service, it is recommended that the application sends a GET request to OBS. The connection can then be closed without receiving entity data. This mechanism generates two copies of data traffic on another object storage service because CDN and OBS both request the file from this object storage service.

### Serverless Upload

After a file is uploaded to another object storage service, you can use the function computing service to synchronize the file to Huawei Cloud OBS in serverless mode.

**Figure 1-1** Serverless upload



This architecture requires users to enable the function computing service in other clouds and deploy the code for uploading files to OBS, which will generate the function computing service fee.

# 2 Accelerating Access to Websites Built on ECSs

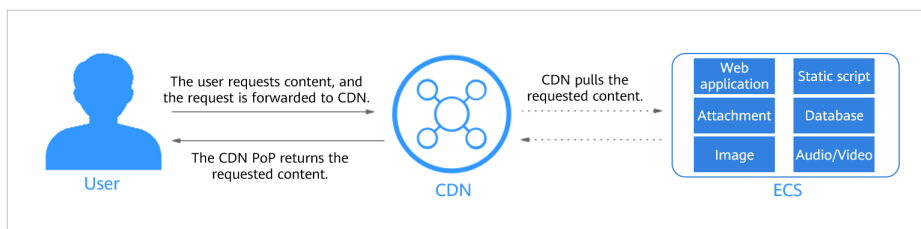
## Background

An ECS is a basic computing component that consists of CPUs, memory, OS, and Elastic Volume Service (EVS) disks. Flexible ECS configuration helps save a large amount of hardware costs. Assume that a customer deployed a forum website accessible through a domain name on Huawei Cloud ECS. The initial service volume was small, and user access was smooth. As the services grew, the access traffic increased sharply. Users complained about problems such as slow access. To improve the access speed and user experience, the customer decided to use Huawei Cloud CDN.

## Solution Overview

Using Huawei Cloud CDN to accelerate content delivery for websites built on ECSs can reduce costs and improve user experience.

**Service process:** When a user initiates an access request, CDN checks whether the content requested by the user is cached on the CDN PoP with the fastest response speed. If a CDN PoP has cached the content, it directly returns the content to the user. If the CDN PoP does not cache the content, it pulls the content from the origin server, returns the content to the user, and caches the content.



## Solution Advantages

- Users access website content through CDN, reducing the pressure on the origin server.
- The unit price of CDN traffic is lower than that of the traffic generated when ECSs directly access the Internet, saving 50% to 57% of the bandwidth cost.

- Users can obtain content from the nearest CDN PoP, which shortens the network transmission distance and ensures the quality of static content.

## Procedure

1. Set up a forum website on an ECS. For details, see [Setting Up a Discuz Forum](#).
  - The IP address of the server is 192.168.1.1.
  - The domain name of the website is discuztest.com.
2. Enable CDN.
  - a. Log in to [Huawei Cloud console](#). Choose **Service List > Content Delivery & Edge Computing > Content Delivery Network**. The CDN console is displayed.
  - b. Select a billing option, read and agree to the service agreement, and click **Enable Now**.
3. Add a domain name on CDN.
  - a. In the navigation pane of the CDN console, choose **Domains**.
  - b. On the **Domains** page, click **Add Domain Names** and configure the acceleration domain name and origin server information.
    - **Domain Names:** Enter **discuztest.com**.
    - **Service Area:** Select **Chinese mainland**.
    - **Service Type:** Select **Website**.
    - **Origin Server Settings**
      - **Origin Protocol:** Select **HTTP**.
      - **Type:** Select **IP address**.
      - **Address:** Enter **192.168.1.1**.
      - **Priority:** Select **Primary origin server**.
      - **Host Header:** By default, the acceleration domain name is used.

**Add Domain Name**

\* Domain Name   
+ Add

\* Enterprise Project

\* Service Type  Website  File download  On-demand service  
For web portals, e-commerce platforms, news apps, and user generated content (UGC) apps. [How Do I Select a Service Type?](#)

\* Service Area  Europe  Global(Chinese\_mainland not included)

\* Origin Server Address  IP address  Domain name

OK Cancel



- c. Click **OK**.

 **NOTE**

The configuration takes 5 to 10 minutes to take effect. When **Status** of the domain name becomes **Enabled**, the domain name has been added.

- 4. Test your domain name before adding a CNAME record to the domain's DNS records to ensure that your domain configurations are correct. For details, see [\(Optional\) Testing the Domain Name](#).
- 5. Configure CNAME resolution. CDN automatically generates a CNAME after you add a domain name. The CNAME cannot be accessed directly. You must add it to your domain's DNS records. Then requests for your domain name will be redirected to CDN PoPs for acceleration.

In this practice, the generated CNAME is **discuztest.com.7fb73989.cdnhwcedi10.com**.

- a. In the upper left corner of [Huawei Cloud console](#), choose **Service List > Networking > Domain Name Service**.  
The DNS console is displayed.
- b. In the navigation pane, choose **Public Zones**.  
The public zone list is displayed.
- c. Click the domain name you want to add a record set to. In this practice, the domain name is **discuztest.com**.
- d. Click **discuztest.com**. On the displayed page, click **Add Record Set** in the upper right corner. The **Add Record Set** dialog box is displayed.
- e. Set the parameters as prompted. Use the default values for the parameters that are not listed in the following table.

Parameter	Description	Example
Name	Domain name prefix.	www
Type	Type of the record set.	CNAME – Map one domain to another
Line	Resolution line. The DNS server will return the IP address of the specified line based on the source of visitors. You must add a <b>Default</b> line to ensure that the website is accessible to users of all carriers.	Default
TTL (s)	Cache duration of the record set on a local DNS server. If your service address changes frequently, set <b>TTL</b> to a smaller value.	5 min

Parameter	Description	Example
Value	Domain name to be pointed to. If CDN acceleration is not enabled, the value is the ECS domain name. If CDN acceleration is enabled, the value is the CNAME generated by CDN.	discuztest.com.7fb73989.cdnhwcedi10.com

- f. Click **OK**.
6. Check whether the CNAME record has taken effect.  
Open the Windows command line interface and run the following command:  

```
nslookup -qt=cname Acceleration domain name
```

In this practice, the acceleration domain name is **discuztest.com**. If the CNAME generated by CDN is displayed, the CNAME configuration has taken effect.
7. Check whether the configuration is successful.  
Log in to the forum website and browse web pages. If the website can be visited, the acceleration configuration is successful.

# 3 Setting the Cache TTL

---

CDN caches origin content on globally distributed PoPs so that users can obtain the content from nearby PoPs. On the CDN console, you can set the cache TTL for origin content of different file types based on service requirements.

## Impact of Origin Servers on CDN PoP Caches

- If you have configured a cache rule on the origin server, the following scenarios are possible:
  - If you have set **Cache-Control** to **no-cache**, **private**, or **no-store** on the origin server and enabled **Origin Cache Control** on the CDN console, CDN PoPs do not cache origin content. Instead, CDN PoPs pull content from the origin server each time the content is requested. This does not achieve acceleration.

### NOTE

By default, **Origin Cache Control** is disabled on the CDN console.

- If you have set a specific TTL on the origin server, this TTL will be overwritten by that set on the CDN console.
- If no cache rules are set on the origin server, cache rules set on the CDN console are used.

## Setting a Cache TTL Based on Service Type

### Default cache TTL

- If the service type is website acceleration, file download acceleration, or on-demand service acceleration, and the origin server address is an IP address or domain name, the following default cache rules are available:
  - The default cache TTL for common dynamic files (for example, .php, .jsp, .asp, and .aspx files) is 0. CDN pulls content from the origin server directly when receiving requests for such dynamic files. You can modify and delete this rule.
  - The default cache TTL for other files is 30 days. You can modify but cannot delete this rule.
- If your origin server is an OBS bucket, the default cache TTL for all files is 30 days. You can modify but cannot delete this rule.

 **NOTE**

You can add a custom cache rule with a higher priority so that custom rule will be used.

- If the service type is whole site acceleration, a cache rule with **Type** set to **All files** and **Maximum Age** set to **0** is available by default. You can modify and delete this rule.

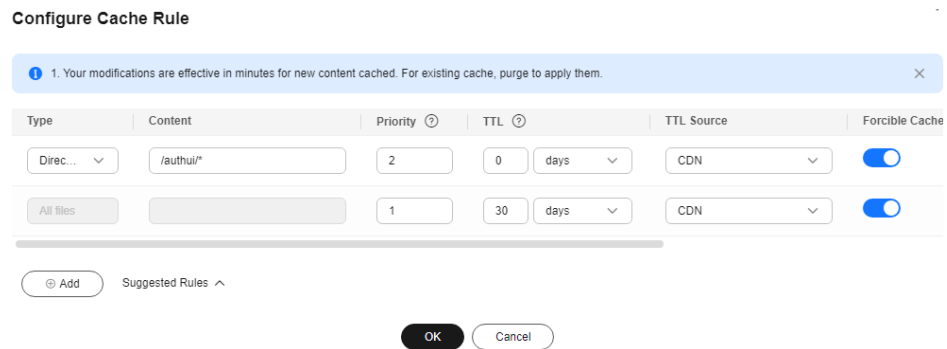
**You can configure a cache TTL based on the service type and the following suggestions.**

- Website acceleration
  - Do not cache dynamic files such as .php, .aspx, .asp, .jsp, .do, .dwr, .cgi, .fcgi, .action, .ashx, .axd, and .json files.
  - Cache .shtml, .html, .htm, and .js files for seven days.
  - Cache other static files for 30 days.
- Download acceleration
  - Do not cache dynamic files such as php, aspx, asp, jsp, and .do files.
  - Cache files of the following types for 30 days: .7z, .apk, .wdf, .cab, .dhp, .exe, .flv, .gz, .ipa, .iso, .mpk, .mpq, .pbcv, .pxl, .qnp, .r00, .rar, .xy, .xy2, .zip, and .cab.
- On-demand service acceleration
  - Do not cache dynamic files such as .php, .aspx, .asp, .jsp, and .do files.
  - Cache the following file types for seven days: .mww, .html, .htm, .shtml, .hml, .gif, .swf, .png, .bmp, and .js.
  - Cache the following file types for 30 days: .mp3, .wma, .7z, .apk, .wdf, .cab, .dhp, .exe, .flv, .gz, .ipa, .iso, .mpk, .mpq, .pbcv, .pxl, .qnp, .r00, .rar, .xy, .xy2, .zip, and .cab.

## Procedure

1. Log in to [Huawei Cloud console](#). Choose **Service List > Content Delivery & Edge Computing > Content Delivery Network**.  
The CDN console is displayed.
2. In the navigation pane, choose **Domains**.
3. In the domain list, click the target domain name or click **Configure** in the **Operation** column.
4. Click the **Cache Settings** tab.
5. In the **Cache Rules** area, click **Edit**.  
The **Configure Cache Rule** dialog box is displayed.
6. Click **Add** to add cache rules. [Table 3-1](#) describes the parameters.

**Figure 3-1** Configuring a cache rule



**Table 3-1** Cache rule parameters

Parameter	Description	Configuration Rule
All files	All cached resources on CDN PoPs	By default, CDN has a rule for every new domain name. The rule specifies that the cache TTL for <b>All files</b> is 30 days. You can modify but cannot delete this rule.
File type	Files of a specific type If the service type of a new domain name is <b>Website</b> , <b>File download</b> , or <b>On-demand service</b> and its origin server is a private one, CDN adds a rule to it by default. The rule specifies that the cache TTL is 0 for common dynamic files, such as .php .jsp .asp, and .aspx files. CDN pulls such files from the origin server for every request. You can modify and delete this rule.	<ul style="list-style-type: none"> <li>All file types are supported.</li> <li>Start each file name extension with a period (.), and separate file name extensions with semicolons (;).</li> <li>Enter up to 255 characters.</li> <li>Enter up to 20 file name extensions.</li> <li>File name extensions are case-insensitive.</li> </ul> Example: <b>.JPG;.zip;.exe</b>
Directory	All files in a directory	Start a directory with a slash (/), and separate multiple directories with semicolons (;). Enter a maximum of 20 directories with a maximum of 255 characters in total. Example: <b>/test/folder01;/test/folder02</b>

Parameter	Description	Configuration Rule
Full path	A specific file	A full path must start with a slash (/) and cannot end with a wildcard (*). A file in the specified directory or file with the wildcard (*) can be matched. Enter only one full path. Examples: <b>/test/index.html</b> or <b>/test/*.jpg</b>
Homepage	Root directory	The root directory of a website is the top-level directory of the website folder, which contains all subfolders of the website. For example, for <b>abc/file01/2.png</b> , <b>abc/</b> is the root directory, and a cache rule is configured for <b>abc/</b> .
Priority	Priority of a cache rule Each cache rule must have a unique priority. If a resource is specified in multiple cache rules, the rule with the highest priority is applied.	Enter an integer ranging from 1 to 100. A greater number indicates a higher priority.
Maximum Age	Duration that a file can be cached. If the cache TTL of the file has reached, CDN requests the most recent content of the file from the origin server when a user requests the file from a CDN PoP. In addition, the CDN caches that content on the CDN PoP.	The cache TTL of a cached file cannot exceed 365 days. You are advised to set the time according to the following rules: <ul style="list-style-type: none"> <li>• For static files (such as .jpg and .zip files) that are not frequently updated, set the TTL to more than one month.</li> <li>• For static files (such as JS and CSS files) that are frequently updated, set the TTL based on service requirements.</li> <li>• For dynamic files (such as PHP, JSP, and ASP files), set the TTL to 0 seconds.</li> </ul>

Parameter	Description	Configuration Rule
Query Parameters	<p>Most web page requests carry URL parameters starting with a question mark (?). If parameters do not contain important information (such as version), you can ignore them to improve the cache hit ratio and speed up delivery.</p> <p><b>Configuration rules:</b></p> <ul style="list-style-type: none"> <li>• If resources do not change with URL parameters, ignore query parameters.</li> <li>• If resources change with URL parameters, retain query parameters.</li> <li>• If you have enabled video seek, set <b>Query Parameters</b> to <b>Ignore all</b> for your video resources.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Retain all:</b> CDN retains all parameters following the question mark (?).</li> <li>• <b>Ignore all:</b> CDN ignores all parameters following the question mark (?) in request URLs, improving the cache hit ratio.</li> <li>• <b>Ignore specific:</b> CDN ignores the specified parameters in request URLs but retains other parameters.</li> <li>• <b>Retain specific:</b> CDN retains the specified parameters in request URLs but ignores other parameters.</li> </ul>
URL Parameters	<p>Parameters to be ignored or retained. Leave this parameter blank when <b>Query Parameters</b> is set to <b>Retain all</b> or <b>Ignore all</b>.</p>	<ul style="list-style-type: none"> <li>• Enter up to 10 parameter names separated by semicolons (;).</li> <li>• Only letters, digits, periods (.), underscores (_), and tildes (~) are supported.</li> </ul>

Parameter	Description	Configuration Rule
<p><b>TTL Source</b>, that is, the original <b>Origin Cache Control</b> field</p>	<p>If <b>Cache-Control: max-age</b> or <b>Expires</b> has been configured on the origin server, you can set <b>TTL Source</b> on CDN to synchronize the cache TTL from the origin server to CDN or force CDN to use the shorter TTL between the cache TTL in the cache rule and that on the origin server. By default, the cache TTL in the CDN cache rule is used. <b>TTL Source</b> values include:</p> <ul style="list-style-type: none"> <li>• <b>Origin server</b>: CDN PoPs use the cache TTL set on the origin server.</li> <li>• <b>CDN</b>: CDN PoPs use the cache TTL set in the cache rule.</li> <li>• <b>Whichever is shorter</b>: CDN PoPs use the shorter TTL between the cache TTL in the cache rule and that on the origin server.</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If both <b>Cache-Control</b> and <b>Expires</b> are configured on the origin server, <b>Cache-Control</b> is preferentially used.</li> <li>• If <b>TTL Source</b> is set to <b>Origin server</b>, but neither <b>Cache-Control</b> nor <b>Expires</b> is configured on the origin server, CDN PoPs use the cache rule configured on CDN.</li> </ul>	<p>The default TTL source is CDN.</p>



Parameter	Description	Configuration Rule
Forcible Cache	<p>Whether to ignore the <b>no-cache</b>, <b>private</b>, and <b>no-store</b> fields in the <b>Cache-Control</b> response header of the origin server. When this function is enabled, these fields are ignored. Forcible cache supplements TTL source. The rules are as follows:</p> <ol style="list-style-type: none"> <li>When <b>TTL Source</b> is set to <b>Origin server</b> and <b>Forcible Cache</b> is disabled: <ul style="list-style-type: none"> <li>If <b>no-cache</b>, <b>private</b>, or <b>no-store</b> is set in the <b>Cache-Control</b> response header, CDN PoPs do not cache resources.</li> <li>If other response headers are set, the priority is <b>s-maxage</b> &gt; <b>max-age</b> &gt; <b>expires</b>. For example, if <b>Cache-Control: max-age=500, s-maxage=400</b> is set on the origin server, the cache TTL on CDN PoPs is 400s.</li> <li>If the preceding response headers are not set, the cache TTL configured on the CDN console is used.</li> </ul> </li> <li>When <b>TTL Source</b> is set to <b>Origin server</b> and <b>Forcible Cache</b> is enabled: <ul style="list-style-type: none"> <li>If cache directives are set in the response header of the origin server, the priority is <b>s-maxage</b> &gt; <b>max-age</b> &gt; <b>expires</b>. For example, if <b>Cache-Control: max-age=500, s-maxage=400</b> is set on the origin server, the cache TTL on CDN PoPs is 400s.</li> </ul> </li> </ol>	By default, this function is enabled.

Parameter	Description	Configuration Rule
	<ul style="list-style-type: none"> <li>• If the preceding response headers are not set, the cache TTL configured on the CDN console is used.</li> </ul> <p>3. When <b>TTL Source</b> is set to <b>CDN</b> and <b>Forcible Cache</b> is enabled:</p> <ul style="list-style-type: none"> <li>• CDN ignores response headers from the origin server and uses the cache TTL configured on the CDN console.</li> </ul> <p>4. When <b>TTL Source</b> is set to <b>CDN</b> and <b>Forcible Cache</b> is disabled:</p> <ol style="list-style-type: none"> <li>a. If <b>no-cache</b>, <b>private</b>, or <b>no-store</b> is set in the <b>Cache-Control</b> response header sent from the origin server, CDN PoPs do not cache resources.</li> <li>b. If <b>no-cache</b>, <b>private</b>, or <b>no-store</b> is not set, CDN uses the cache TTL configured on the CDN console.</li> </ol> <p>5. When <b>TTL Source</b> is set to <b>Whichever is shorter</b> and <b>Forcible Cache</b> is disabled:</p> <ul style="list-style-type: none"> <li>• If the cache TTL set on CDN is shorter, the rule <b>6.d</b> is used.</li> <li>• If the cache TTL set on the origin server is shorter, the rule <b>6.a</b> is used.</li> </ul> <p>6. When <b>TTL Source</b> is set to <b>Whichever is shorter</b> and <b>Forcible Cache</b> is enabled:</p> <ul style="list-style-type: none"> <li>• If the cache TTL set on CDN is shorter, the rule <b>6.c</b> is used.</li> <li>• If the cache TTL set on the origin server is</li> </ul>	

Parameter	Description	Configuration Rule
	shorter, the rule <b>6.b</b> is used.	

- (Optional) Delete a cache rule if you no longer use it.
- Click **OK**.

 **NOTE**

**If you have modified a cache rule,**

- Your modifications are effective for new content cached.
- You can purge to apply modifications to the existing cache.

# 4 Improving the Cache Hit Ratio

## Background

If the CDN cache hit ratio is low, the pressure on the origin server is high and the static resource access efficiency is low. You can select an optimization policy based on the cause of the low cache hit ratio to improve the cache hit ratio. In CDN, the cache hit ratio includes the traffic hit ratio and request hit ratio.

- **Traffic hit ratio** = Traffic generated by requests that hit the cache/Total traffic of requests
- **Request hit ratio** = Number of requests that hit the cache/Total number of requests

### NOTE

The traffic hit ratio indicates the load on the origin server. A lower traffic hit ratio means a larger origin pull traffic, which leads to a larger output traffic and higher bandwidth consumption on the origin server.

## Viewing the Cache Hit Ratio

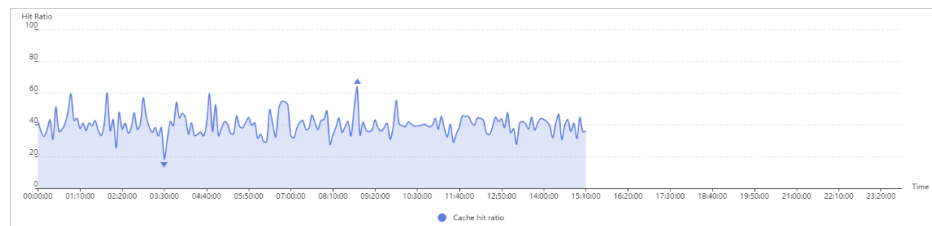
You can log in to the CDN console to view the traffic hit ratio and request hit ratio.

1. Log in to [Huawei Cloud console](#). Choose **Service List > Content Delivery & Edge Computing > Content Delivery Network**.  
The CDN console is displayed.
2. In the navigation pane, choose **Analytics**.
3. Choose **Traffic** and **Requests** under **Analytics** to view the traffic hit ratio and request hit ratio.

Figure 4-1 Traffic hit ratio



Figure 4-2 Request hit ratio



## Optimizing the Cache Hit Ratio

1. Set an appropriate cache TTL.

CDN caches origin content on globally distributed PoPs so that users can obtain the content from nearby PoPs. You can set a proper TTL for different content on the CDN console to improve the cache hit ratio.

- For static files (such as images and app packages) that are not frequently updated, set the TTL to more than one month.
- For static files (such as JS and CSS files) that are frequently updated, set the TTL based on service requirements.
- For dynamic files (such as PHP, JSP, and ASP files), set the TTL to **0**, so these files will not be cached on CDN PoPs.

For details, see [Setting the Cache TTL](#).

### NOTE

- By default, **Origin Cache Control** is disabled. If you have set **Cache-Control** to **s-maxage=0, max-age=0, no-cache, no-store**, or **private** on the origin server and enabled **Origin Cache Control** on the CDN console, CDN PoPs cannot cache origin content and frequently pulls content from the origin server.
  - If your origin server has multiple hosts and the **Last-modified**, **Etag**, and **Content-Length** parameters of a resource on these hosts are set to different values, CDN PoPs cannot cache the resource and frequently pulls the resource.
  - If origin content has been updated, purge the URLs of the content to ensure that users can obtain the latest content.
  - **If you have modified a cache rule,**
    - Your modifications are effective for new content cached.
    - You can purge to apply modifications to the existing cache.
2. Set URL parameter rules.

Currently, most web page requests carry URL parameters following a question mark (?). Parameters that do not contain important information (such as version) do not affect users' access to the correct content. When setting a cache rule, you can set **Query Parameters** to **Ignore all** or **Ignore specific** to improve the cache hit ratio and distribution efficiency. For details, see [Cache Rules](#).

### Typical applications

- When a user requests <http://www.example.com/1.txt?test1> for the first time, the content is not cached on CDN, and CDN pulls that content from the origin server. If **Query Parameters** is set to **Ignore all** on CDN, when another user requests <http://www.example.com/1.txt?test2>, the parameter behind the question mark (?) will be ignored. As a result, the cache of <http://www.example.com/1.txt> is hit.

- When a user requests **http://www.example.com/1.txt?test1** for the first time, the content is not cached on CDN, and CDN pulls that content from the origin server. If **Query Parameters** is set to **Retain all** on CDN, when another user requests **http://www.example.com/1.txt?test2**, the full URL, including the parameter behind the question mark (?) will be matched. As a result, no cache is hit and CDN has to pull **http://www.example.com/1.txt?test2** from the origin server.

### 3. Preheat URLs.

CDN can proactively cache origin content to CDN PoPs through cache prefetch. When users access the content, they can directly obtain the latest content from CDN PoPs. For details, see [Cache Prefetch](#).

Content prefetch can help you improve the cache hit ratio.

#### Typical scenarios

- Initial access to CDN: When a domain name is connected to CDN for the first time, the origin content is not cached on CDN PoPs. In this case, you can prefetch the origin content to CDN PoPs. Then users can directly obtain the content from the nearest CDN PoP, improving the access speed.
- Installation package release: Before releasing a software installation package or upgrade package, you can prefetch the content to CDN PoPs. After the software or upgrade is launched, the CDN PoPs directly respond to the download requests of a large number of users, which improves the download speed and greatly reduces the pressure on your origin server.
- Promotional activity: Before releasing a promotional campaign, you can prefetch the static content involved on the activity page to CDN PoPs. After the activity starts, the CDN PoPs respond to user requests for accessing all static content, which ensures service availability and improves user experience.

### 4. Enable range requests.

A range request allows the origin server to send a specific range of data to a CDN PoP using the range information in the HTTP request header. Range requests accelerate large file distribution and improve origin pull efficiency and cache hit ratio. For details, see [Range Requests](#).

#### Typical scenarios

- If a user requests a clip of a video, CDN needs to pull the entire video from the origin server when range requests are disabled. As a result, the pull traffic is greater than the traffic used for returning the content to the user, decreasing the cache hit ratio. When range requests are enabled, CDN only needs to pull the requested video clip and returns it to the user, improving the cache hit ratio.

### 5. Perform further operations.

- Do not update an entire directory when a specific cached content needs to be updated.

You can purge the URL of the cached content to force the cache on CDN PoPs to expire. Purging the entire directory will force the cache of all content in the directory to expire. When a user accesses a resource in the directory, no cache is hit and CDN needs to pull the resource from the origin server. Therefore, do not purge the entire directory, especially the root directory.

- Do not carry dynamic parameters in URLs.  
If your URLs contain dynamic parameters, such as timestamps, CDN cannot cache the content and frequently pulls the content.

### Checking Whether Requests for a URL Hit the Cache

1. Open Google Chrome and press **F12**.
2. Choose **Network**.
3. Enter the website to be accessed in the address box and press **Enter**. View the response headers of the URL of a specific resource and perform the following operations:
  - If the value of the **x-hcs-proxy-type** header is **1**, the cache is hit. If the value is **0**, the cache is not hit.

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# A Change History

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Released On	Description
2023-01-10	This issue is the second official release. <ul style="list-style-type: none"><li>• Added section "Configuring a Policy for a Custom OBS Private Bucket."</li></ul>
2023-03-30	This issue is the first official release.