

Content Delivery Network

Best Practices

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Contents

1 Configuring a Policy for a Custom OBS Private Bucket.....	1
2 Accelerating ECS Resources.....	3
3 Setting the Cache TTL.....	7
4 Improving the Cache Hit Ratio.....	13
A Change History.....	17

1 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.

2 Accelerating ECS Resources

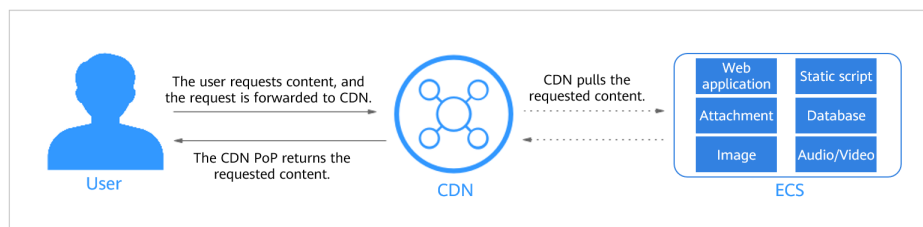
Prerequisites

- You have purchased an **Elastic Cloud Server (ECS)** and **bound an EIP**.
- You have prepared a domain name that meets **domain name access requirements**.
- You have **enabled CDN**.

Background

An ECS is a basic computing component that consists of CPUs, memory, OS, and Elastic Volume Service (EVS) disks. You can configure ECSs based on service requirements, saving a large amount of hardware costs. If ECSs are deployed in different regions, cross-region access may cause network latency, affecting user experience.

Huawei Cloud CDN can accelerate websites to deliver a better user experience. If you use CDN to accelerate ECS resources, you can improve user experience at low costs. 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 the CDN PoP has cached the content, the CDN PoP directly returns the content to the user. If the CDN PoP does not cache the content, the CDN PoP 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. 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** and configure the domain name and CDN acceleration information. For details, see [Adding a Domain Name](#).
 - **Domain Names:** download.game-apk1.com is used as an example.
 - **Service Area:** Select the service area based on your service requirements.
 - **Service Type:** Select a service type based on the [application scenario](#).
 - **Origin Server Settings**
 - **Origin Protocol:** Select a protocol for origin pulls.
 - **Type of the origin server:** Select **IP address** or **Domain name**.
 - **Address:** Enter an IP address or domain name.
 - **Priority:** Select **Primary Origin Server** or **Standby Origin Server**.
 - **Host Header:** Specify the host. 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

- d. 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.

2. 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](#).

3. **Configure a CNAME record on DNS.**

After the domain name is added, CDN automatically generates a CNAME record for the domain name. The CNAME record 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 example, the automatically generated CNAME record is **download.game-apk1.com.7fb73989.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 service providers, see [Configuring a CNAME Record](#).

- a. Log in to [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 example, 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 Default line to ensure that the website is accessible to users of all carriers.	Default

Parameter	Description	Example
TTL (s)	Cache duration of the record set on a local DNS server. If your service address changes frequently, set TTL to a smaller value.	The default value is 300 seconds, which is, 5 minutes.
Value	Domain name alias If CDN acceleration is not enabled, the value is the ECS domain name. If CDN acceleration is enabled, the value is the CNAME record generated by CDN.	download.game-apk1.com.7fb73989.c dnhwcedi10.com

- f. Click **OK**.
- g. Verify that 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 example, the acceleration domain name is **download.game-apk1.com**. If the CNAME record generated by CDN is displayed, the CNAME configuration has taken effect.

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 files other than common dynamic 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.

- 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 the following file 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

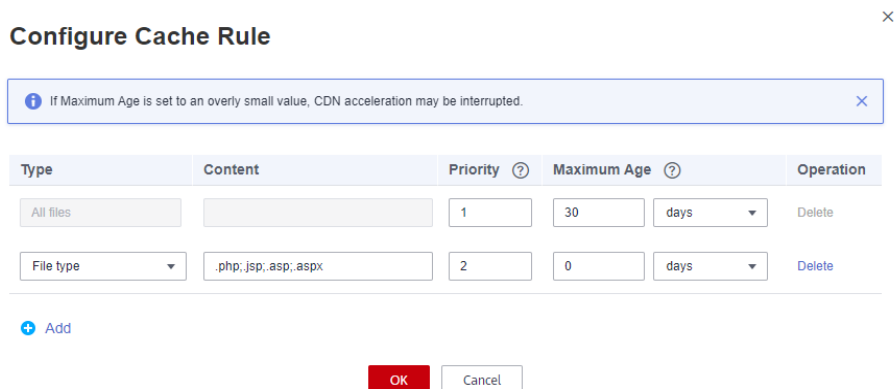


Table 3-1 Cache rule parameters

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 All files 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 Website , File download , or On-demand service 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"> All file types are supported. Start each file name extension with a period (.), and separate file name extensions with semicolons (;). Enter up to 255 characters. Enter up to 20 file name extensions. File name extensions are case-insensitive. Example: .JPG;.zip;.exe
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: /test/folder01;/test/folder02

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: /test/index.html or /test/*.jpg
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 abc/file01/2.png , abc/ is the root directory, and a cache rule is configured for abc/ .
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"> • For static files (such as .jpg and .zip files) 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 seconds.

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>Configuration rules:</p> <ul style="list-style-type: none"> • If resources do not change with URL parameters, ignore query parameters. • If resources change with URL parameters, do not ignore query parameters. • If you have enabled video seek, set Query Parameters to Ignore all for your video resources. 	<ul style="list-style-type: none"> • Retain all: CDN retains all parameters following the question mark (?). • Ignore all: CDN ignores all parameters following the question mark (?) in request URLs, improving the cache hit ratio. • Ignore specific: CDN ignores the specified parameters in request URLs but retains other parameters. • Retain specific: CDN retains the specified parameters in request URLs but ignores other parameters.
URL Parameters	<p>Parameters to be ignored or retained. Leave this parameter blank when Query Parameters is set to Retain all or Ignore all.</p>	<ul style="list-style-type: none"> • Enter up to 10 parameter names separated by semicolons (;). • Only letters, digits, periods (.), underscores (_), and tildes (~) are supported.

Parameter	Description	Configuration Rule
Origin Cache Control	<p>If Cache-Control: max-age or Expires has been configured for the origin server and you want the cache TTL on the CDN side to be the same as that configured on the origin server, you can switch on Origin Cache Control. Then Cache-Control: max-age or Expires determines how long content is cached on CDN PoPs.</p> <p>NOTE</p> <ul style="list-style-type: none">• If both Cache-Control and Expires are configured on the origin server, Cache-Control is preferentially used.• If origin cache control is enabled on CDN but neither Cache-Control nor Expires is configured on the origin server, CDN PoPs use the cache rules configured on CDN.	By default, this function is disabled.

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

 **NOTE**

If you have modified a cache rule, the new rule does not apply to content that has been cached but only applies to new content. If you want the modification to take effect immediately, purge the cache after modifying the cache rule.

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.

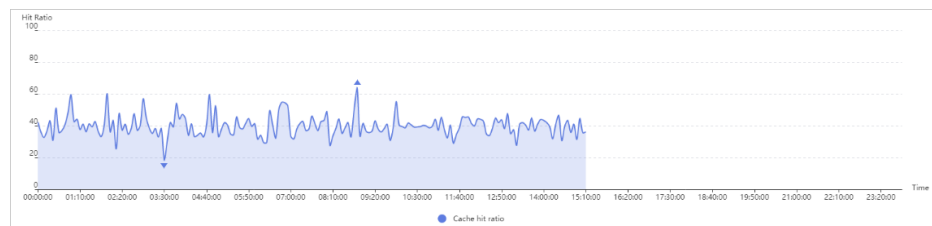
Viewing the Cache Hit Ratio

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

- 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. By default, **Origin Cache Control** is disabled.
- 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, refresh the URLs of the content to ensure that users can obtain the latest content.
- **If you have modified a cache rule**, the new rule does not apply to content that has been cached but only applies to new content. If you want the modification to take effect immediately, purge the cache after modifying the cache rule.

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 content cached on CDN PoPs to expire. Purging the entire directory will force 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 content 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.

A Change History

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