Alibaba Cloud
Alibaba Cloud CDN

Best Practices

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 Danger: Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 Warning: Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 Notice: Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 Note: You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
Bold	It is used for buttons, menus , page names, and other UI elements.	Click OK.
`Courier font`	It is used for commands.	Run the `cd /d C:/windows` command to enter the Windows system folder.
Italics	It is used for parameters and variables.	`bae log list --instanceid` *Instance_ID*
[] or [a|b]	It indicates that it is a optional value, and only one item can be selected.	`ipconfig` *[-all|-t]*

Style	Description	Example
{} or {a|b}	It indicates that it is a required value, and only one item can be selected.	`swich {stand | slave}`

Contents

1 Accelerate OSS access with CDN

1.1 Overview

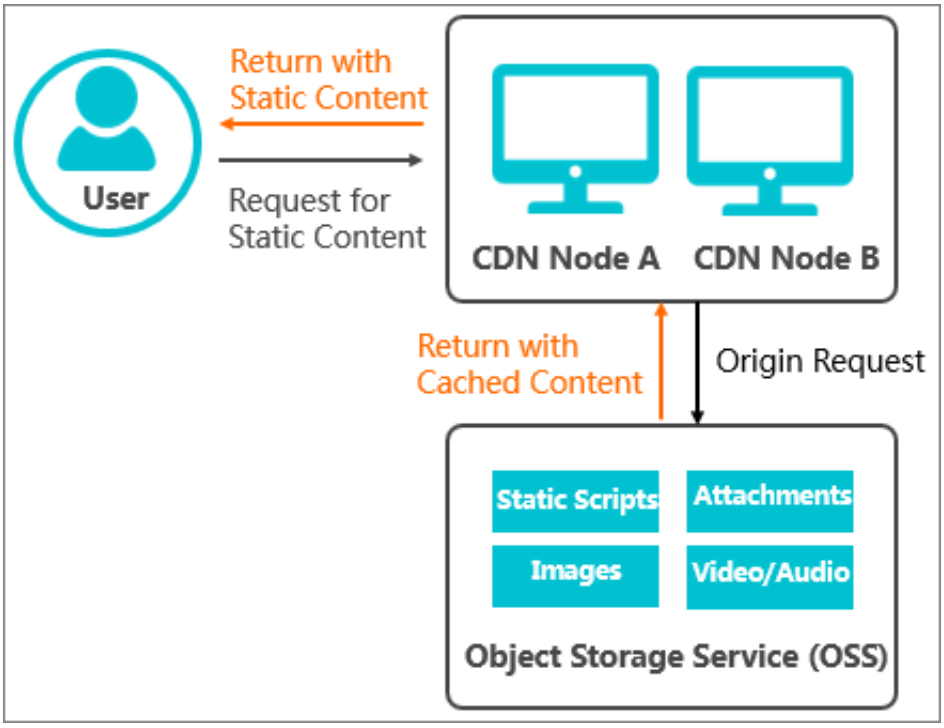
Alibaba Cloud allows you store static resources on OSS buckets and accelerate the access to the static resources through CDN. This topic describes the details about CDN-accelerated OSS access, including the background information, application scenarios, implementation methods, and related products.

Background information

Alibaba Cloud CDN works with a precise scheduling system. Your requests for static resources are sent to the corresponding nearest CDN nodes, which allows you to retrieve the required resources as quickly as possible. In this way, the network congestion issues are resolved and the response speed for resource access is improved.

Scenarios

Static resources stored on OSS buckets include static scripts, images, attachments, and audio or video content. When an end user accesses or downloads static resources that are stored on an OSS bucket, the delivery of the requested resources can be accelerated by CDN. CDN caches the resources on the origin (OSS bucket) to the nearest CDN node and automatically returns the requested resources from its cache. The following figure shows the architecture of CDN's accelerating access to resources on an OSS bucket.



This architecture has the following benefits:

- All user requests are responded through CDN, which minimizes the pressure on the origin server.
- The CDN Internet traffic cost is lower than the OSS Internet traffic cost.
- Resources are retrieved from the nearest CDN node to the client, which minimizes the network transmission distance and ensures the quality of static resources.

How to implement CDN-based OSS access acceleration

For CDN to accelerate the access to an OSS bucket, use one of the following methods:

- Map the bucket domain name to a CDN domain name, and bind a custom domain name to the CDN domain name. For more information, see Implement acceleration from the CDN console.
- Bind the custom domain name to the bucket domain name and enable CDN acceleration. For more information, see #unique_6.

Related products

You can use CDN in OSS to accelerate website access and minimize the OSS Internet traffic fees. For more information, see OSS documentation.

1.2 Implement acceleration from the CDN console

This topic describes how to implement CDN acceleration for the access to OSS buckets from the CDN console.

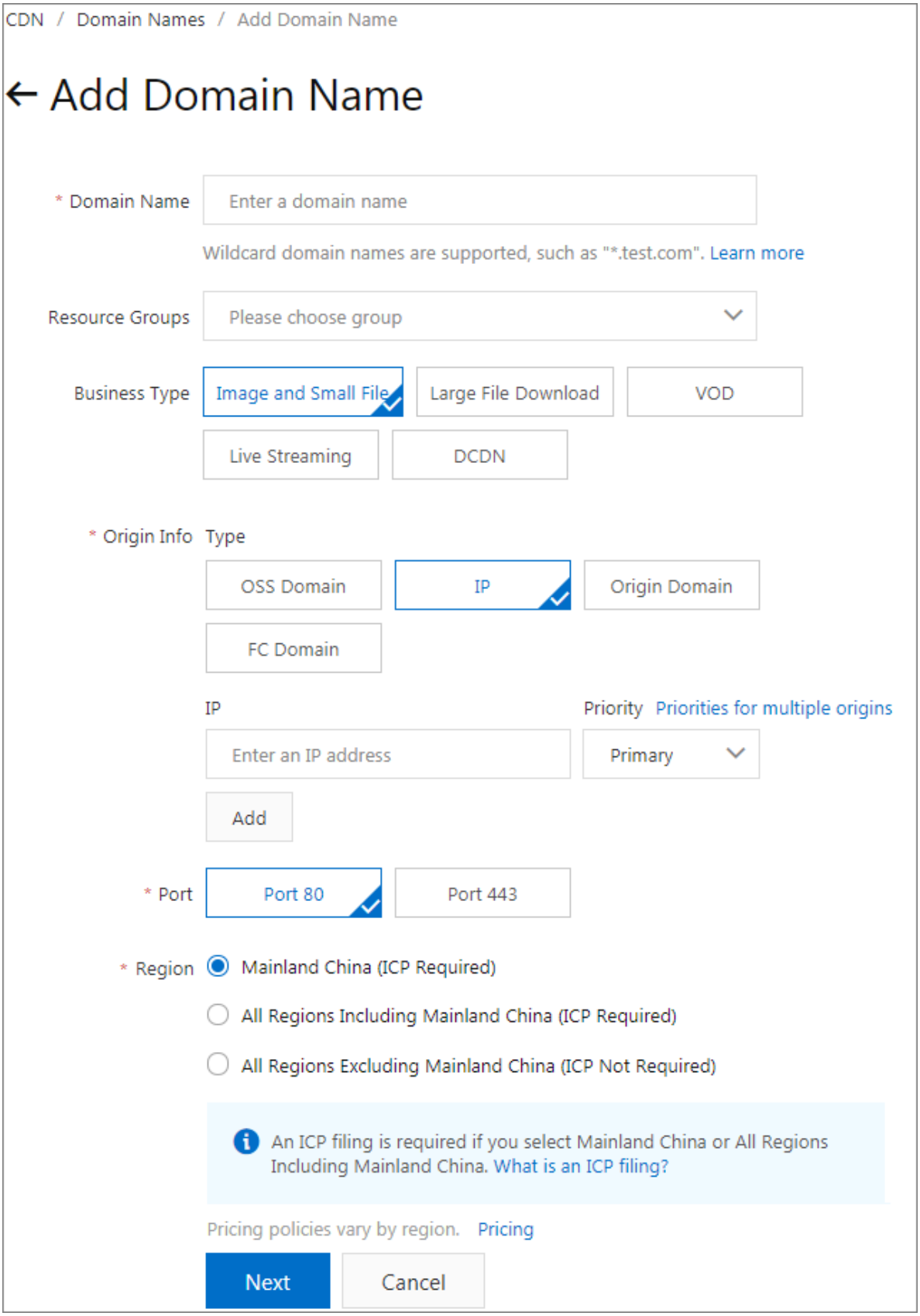
Prerequisites

Before you perform the tasks described in this document, make sure that you have completed account registration and real-name authentication with Alibaba Cloud.

Procedure

1. Log on to the Alibaba Cloud CDN console.
2. In the left-side navigation pane, click Domain Names.

3. On the Domain Names page, click Add Domain Name.



4. Enter the CDN domain information and set the origin type to OSS Domain.

Parameter	Description
Domain Name	Enter a domain name, for example, ch.aliyun.com.
Business Type	Content delivery varies by business type. Select the appropriate business type based on your stored content and usage. · Image and Small File · Large File Download · VOD · #unique_11
Origin Info	Select the OSS bucket domain for which you want to accelerate the content delivery. · OSS Domain · IP · Origin Domain · FC Domain
Port	Select an access port as needed. · 80 · 443
Region	Select the region to be accelerated based on your business requirements. · Mainland China · All Regions Including Mainland China · All Regions Excluding Mainland China

5. Click Next, and wait for the approval of the manual review.
6. After the CDN domain is approved, the CDN domain is displayed in the Domain Names list, and the status is displayed as Enabled.

   After a CDN domain is added, a CNAME is automatically generated. For the CDN service to take effect for the domain, you must add a CNAME record at your DNS service provider. For more information, see #unique_12, #unique_13, or #unique_14.

1.3 Implement acceleration from the OSS console

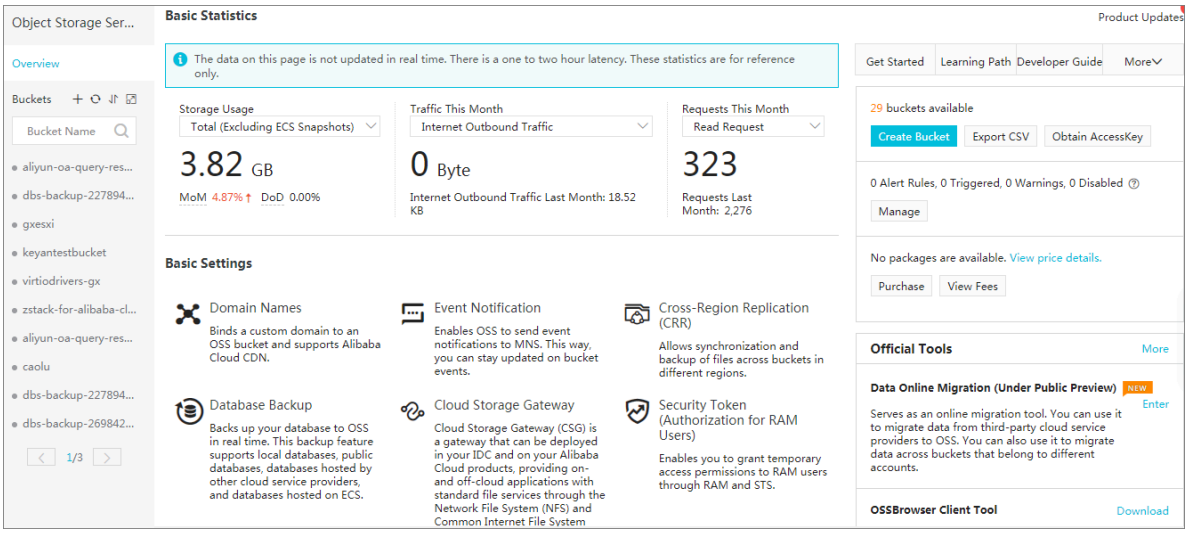
This topic describes how to implement CDN acceleration for the access to OSS buckets from the OSS console.

Prerequisites

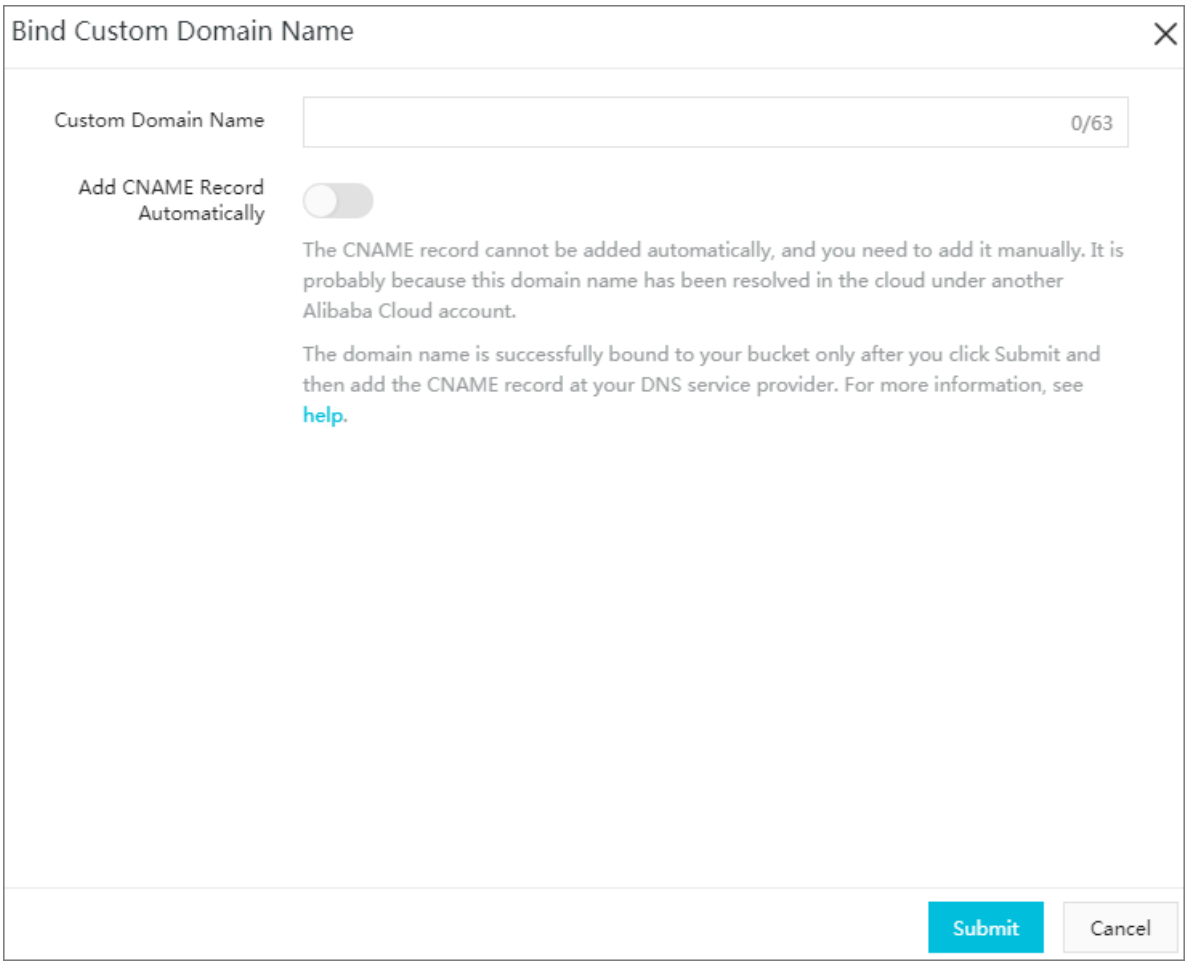
Before you perform the tasks described in this document, make sure that you have completed account registration and real-name authentication with Alibaba Cloud.

Procedure

1. Log on to the OSS console.
2. In the left-side Storage Space list, click the name of the target bucket.



3. Choose Domain Names > Bind Custom Domain Name. The Bind Custom Domain Name dialog box appears.



4. Configure the information of the custom domain to be bound.

Parameter	Description
Custom Domain Name	Enter the custom domain name, for example, hello-world.com.
Alibaba Cloud CDN	Turn on Alibaba Cloud CDN.
Add CNAME Record Automatically	If the domain to be bound is managed by the current Alibaba Cloud account, you can enable this function to automatically add a CNAME record for the domain. If the domain name is not under this account, you must manually add the CNAME record at your DNS service provider. For more information, see #unique_12, #unique_13, or #unique_14.

5. Click Submit.

   Note:

   - A domain name conflict indicates that the domain name has been bound to another bucket. You can click to obtain the TXT information at the prompt and verify the ownership of the domain by adding a TXT record to forcibly bind the domain to this bucket. This operation unbinds the domain from the previous bucket.

6. After you update the domain name information, click Manage Binding Configurations to view the Alibaba Cloud CDN domain name and the bucket domain name.

   Note:
   It takes about 1 minute to update the domain name information.

2 Accelerate ECS access with CDN

2.1 Overview

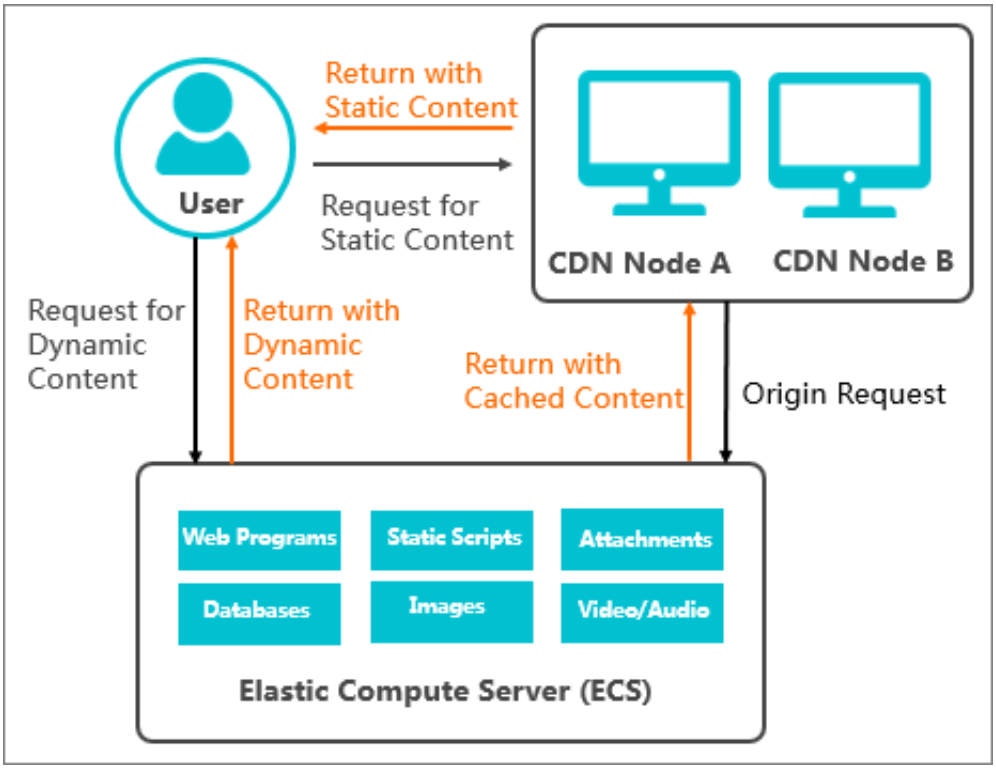
Alibaba Cloud CDN can accelerate the delivery of static resources on ECS instances. Resources that can be stored on ECS instances include static resources and dynamic resources. If you access a dynamic resource on an ECS instance, the ECS instance directly returns the requested dynamic resource to you. If you access a static resource on an ECS instance, CDN accelerates your access and returns you the requested static resource from the cache on the CDN node. This topic describes the details about CDN-accelerated ECS access, including the background information, application scenarios, implementation methods, and related products.

Background information

Alibaba Cloud CDN works with a precise scheduling system. Your requests for static resources are sent to the corresponding nearest CDN nodes, which allows you to retrieve the required resources as quickly as possible. In this way, the network congestion issues are resolved and the response speed for resource access is improved.

Scenarios

Dynamic resources stored on ECS instances include Web programs and databases. Static resources include static scripts, images, attachments, and audio or video content. When you access or download a resource from an ECS instance that serves as the origin, the resource is directly returned to you if it is dynamic. If the requested resource is static, your access can be accelerated by CDN. CDN caches the resources on the ECS instance to the nearest CDN node and returns the requested resource from its cache. The following figure shows the architecture of CDN's accelerating access to resources on an ECS instance.



Note:
If you want to accelerate the delivery of dynamic resources on the ECS instance, you can use the Dynamic Route for CDN service. For more information, see Dynamic Route for CDN documentation.

This architecture has the following benefits:

- All user requests are responded through CDN, which minimizes the pressure on the origin server.
- The CDN Internet traffic cost is lower than the ECS Internet traffic cost.
- Resources are retrieved from the nearest CDN node to the client, which minimizes the network transmission distance and ensures the quality of static resources.

How to implement CDN-based ECS access acceleration

For CDN to accelerate the delivery of resources on an ECS instance, you need to bind the domain name or IP address of the ECS instance to a CDN domain and enable CDN acceleration for the CDN domain. For more information, see #unique_18.

Related products

- You can use ECS to improve website availability, protect origin information, and minimize bandwidth usage costs. For more information, see ECS documentation.

- You can use Dynamic Route for CDN to accelerate the delivery of dynamic resources on ECS instances. For more information, see Dynamic Route for CDN documentation.

2.2 Implement acceleration from the CDN console

This topic describes how to implement CDN acceleration for the access to ECS instances from the CDN console.

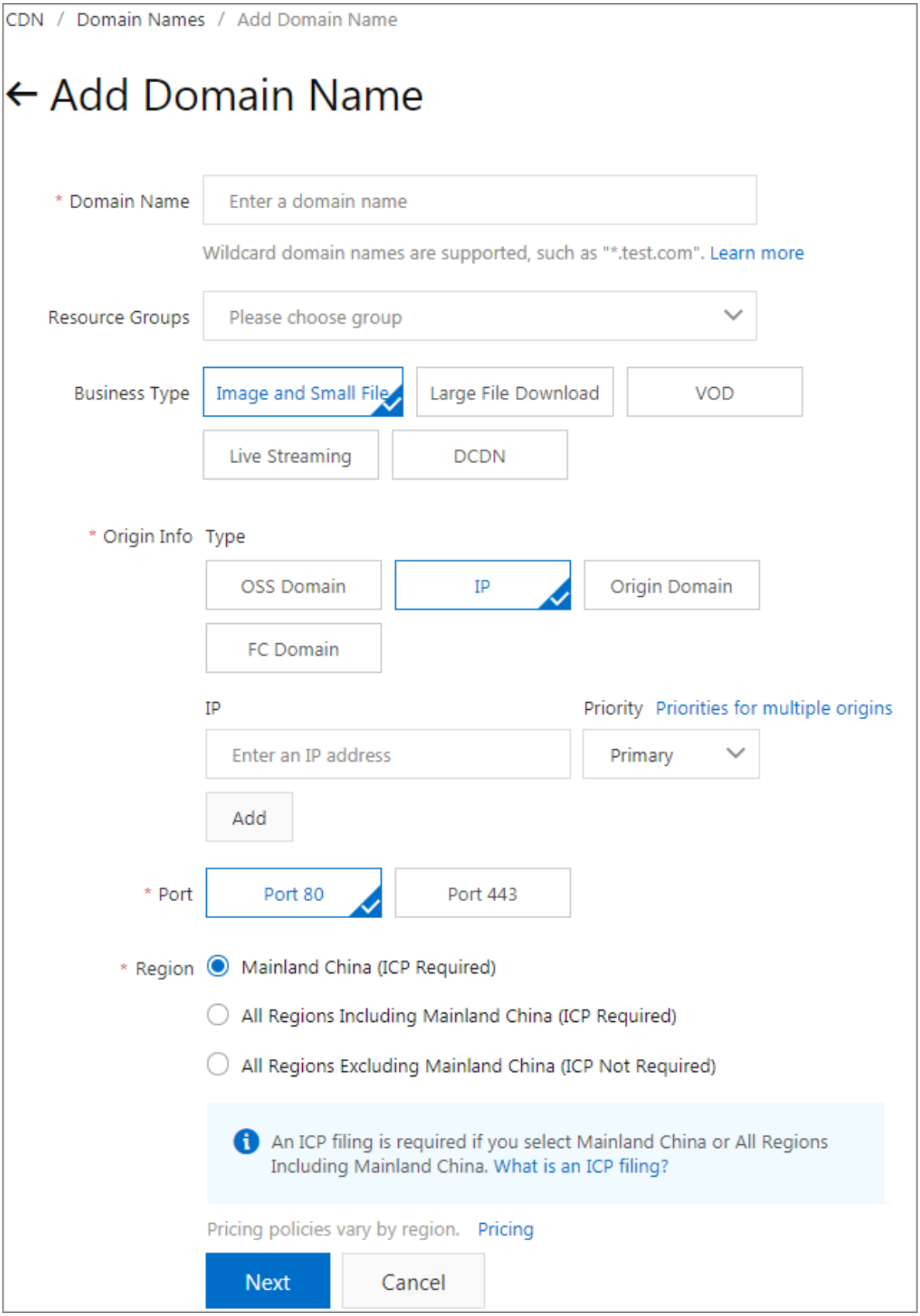
Prerequisites

Before you perform the tasks described in this document, make sure that you have completed account registration and real-name authentication with Alibaba Cloud.

Procedure

1. Log on to the Alibaba Cloud CDN console.
2. In the left-side navigation pane, click Domain Names.

3. On the Domain Names page, click Add Domain Name.



4. Use an ECS instance as the origin, configure the CDN domain information, and select IP or Origin Domain as the origin type.

Parameter	Description
Domain Name	Enter a domain name, for example, ch.aliyun.com.
Business Type	Content delivery varies by business type. Select the appropriate business type based on your stored content and usage. · Image and Small File · Large File Download · VOD · #unique_11
Origin Info	Select the OSS bucket domain for which you want to accelerate the content delivery. · OSS Domain · IP · Origin Domain · FC Domain
Port	Select an access port as needed. · 80 · 443
Region	Select the region to be accelerated based on your business requirements. · Mainland China · All Regions Including Mainland China · All Regions Excluding Mainland China

5. Click Next, and wait for the approval of the manual review.
6. After the CDN domain is approved, the CDN domain is displayed in the Domain Names list, and the status is displayed as Enabled.

   After a CDN domain is added, a CNAME is automatically generated. For the CDN service to take effect for the domain, you must add a CNAME record at your DNS service provider. For more information, see #unique_12, #unique_13, or #unique_14.

3 Optimize the CDN cache hit rates

3.1 Overview

A low CDN cache hit rate imposes heavy pressure on the origin server and causes low access efficiency of static resources. You can select an optimization policy to improve the CDN cache hit rate based on the specific cause of the low CDN cache hit rate.

CDN accelerates the delivery of static resources by caching the static resources to the nearest CDN node. When your client accesses a resource, the CDN node serves the requested resource directly from the cache without retrieving the resource from the origin server. Therefore, the CDN cache hit rate directly affects user experience, and ensuring a high cache hit rate has become the key topic of CDN.

CDN cache hit rates include the byte cache hit rate and request cache hit rate.

- Byte cache hit rate = Number of bytes returned from the CDN cache/Number of bytes returned for all CDN requests

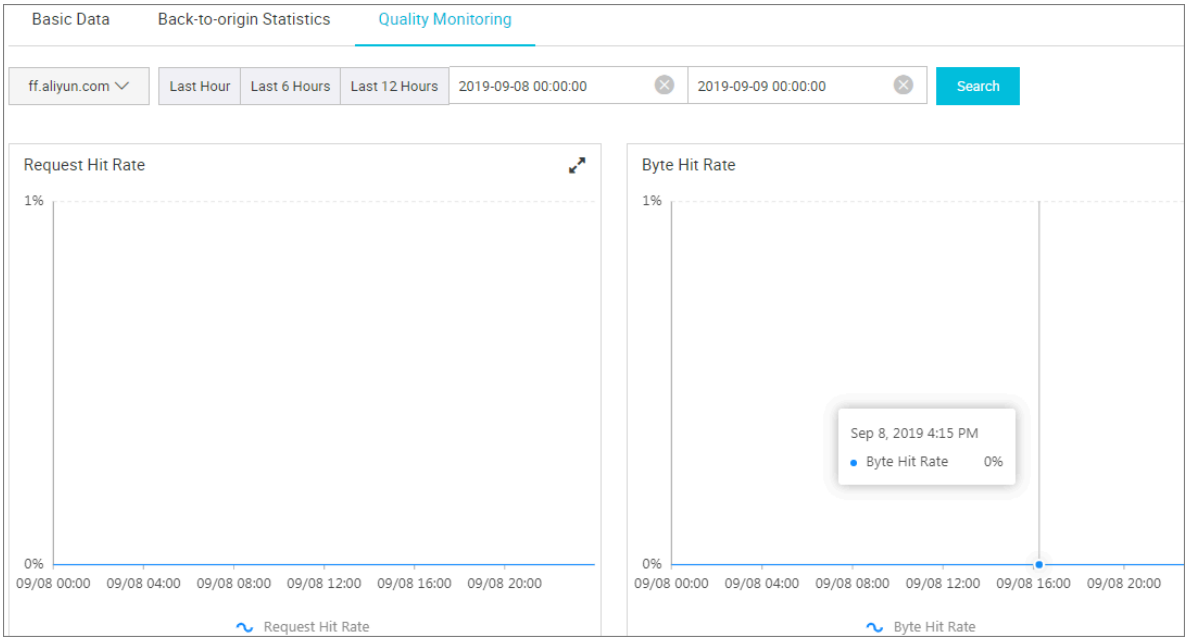
  Note:
  The lower the byte cache hit rate, the higher the back-to-origin traffic. The higher the outbound traffic of the origin server, the larger the bandwidth and other loads of the origin server. Therefore, back-to-origin traffic represents the load pressure on the origin server, and the byte cache hit rate is the main concern in actual business scenarios.
- Request cache hit rate = Number of requests that hit the CDN cache/Number of all CDN requests

View the CDN cache hit rates

You can use either of the following methods to view the CDN cache hit rates.

- By using the console

  The CDN console provides the resource monitoring feature to display the byte cache hit rate, as shown in the following figure.



- By checking logs

  In the CDN request logs, CDN records the cache hit status of all CDN requests. For more information about the log format, see #unique_23. The cache hit status field is displayed as either HIT or MISS. A sample log entry is as follows.

```
26 / Jun / 2019 : 10 : 38 : 19  + 0800 ]  192 . 168 . 53 . 146  -
1542  "-" " GET  http :// www . aliyun . com / index . html "  200
  191  2830  MISS  " Mozilla / 5 . 0  ( compatible ;  AhrefsBot /
5 . 0 ; + http :// ahrefs . com / robot /)" " text / html "
```

  Note:
  The hit status only indicates the hit status of the CDN L1 node. For example, if the requested resource is not found in the cache of the CDN L1 node but is found in the cache of the CDN L2 node, the hit status is still displayed as MISS.

- By using the API

  To query the byte cache hit rate of CDN, call the #unique_24 operation. To query the request cache hit rate of CDN, call the #unique_25 operation.

Optimize the CDN cache hit rates

The following table describes the causes of a low cache hit rate and the correspond ing optimization policies.

Optimization policy	Causes of a low CDN cache hit rate
#unique_26	· During peak business hours, a large number of requests are rerouted to the origin server. · If your CDN domain is not frequently visited, the correspond ing resources may be removed from the cache of the CDN node before they expire.
#unique_27	When the `ETag` or `Last-Modified` response headers are not returned, the requested static resource fails to be cached on CDN.
#unique_28	When the URL of a request includes a *`query string`* or other variable parameters, the requested resource needs to be retrieved from the origin server.

3.2 Preload URLs

You can preload popular resources before the business peak, or preload resources for CDN domains that are not frequently visited. When you access these resources again, you can directly retrieve them from the CDN node. In this way, the CDN cache hit rate is increased.

Prerequisites

Before you perform the tasks described in this document, make sure that you have completed account registration and real-name authentication with Alibaba Cloud.

Context

CDN nodes serve as node resources shared by all CDN users. A cache rule configured on CDN indicates the maximum cache duration for the corresponding resources on CDN. If your CDN domain is not frequently visited, the resources of the CDN domain may be removed from the cache of the CDN node before they expire. The least popular cached resources are the first to be stale in the cache. Popularity refers to how frequently a file is accessed on the node. If the file is not popular enough, it may be removed before it expires.

· The preload feature uploads the specified URLs to the CDN L2 nodes in advance. When you access an associated website again, you do not need to retrieve the requested resources from the origin server. Although the preload feature does not directly increase the L1 hit rate, it improves the real hit rate of CDN.

- The refresh feature clears the cache history of specific URLs or directories. This operation is often performed when the cached content on CDN is stale after the origin server updates the content with the same name. After the refresh operation, the request to the URL will be directly rerouted to the origin server at the next visit . Use the CDN refresh feature with caution because this feature reduces the cache hit rate.

Procedure

1. Log on to the Alibaba Cloud CDN console.
2. In the left-side navigation pane, click Refresh.
3. Set the Operation parameter to Preload, and enter URLs.
4. Click Submit.

3.3 Configure cache rules for resources

When the `ETag` or `Last-Modified` response headers are not returned, the requested static resource fails to be cached. This reduces the CDN cache hit rate. To improve the CDN cache hit rate, you can configure a cache rule for this resource. As a result, the resource can be cached on CDN according to the cache rule.

Prerequisites

Before you perform the tasks described in this document, make sure that you have completed account registration and real-name authentication with Alibaba Cloud.

Context

When no cache rule is configured on CDN, a static file cannot be cached on the CDN node if the `ETag` and `Last-Modified` response headers are not returned. Configure a cache rule for the static file as follows.

As shown in the following figure, the *x-swift-cachetime* response header shows that the cache duration of the static file on CDN is zero seconds. This indicates that CDN will not cache this static file because the ETag and Last-Modified response headers are not returned.

```
< HTTP/2 200
< server: Tengine
< content-type: application/octet-stream
< content-length: 42069884
< date: Wed, 06 Dec 2017 02:17:06 GMT
< x-powered-by: Express
< access-control-allow-origin: *
< access-control-allow-methods: POST, GET, OPTIONS, PUT, DELETE
< access-control-allow-headers: Origin, X-Requested-With, Content-Type, Accept, Accept-Encoding, X-Access-Token
< content-disposition: attachment;filename=
< via: cache16.l2em21-1[45,200-0,M], cache22.l2em21-1[46,0], kunlun6.cn192[129,200-0,M], kunlun5.cn192[130,0]
< x-cache: MISS TCP_MISS dirn:-2:-2 mlen:-1
< x-swift-savetime: Wed, 06 Dec 2017 02:17:06 GMT
< x-swift-cachetime: 0
< timing-allow-origin: *
< eagleid: 3adad78515125266263697607e
```

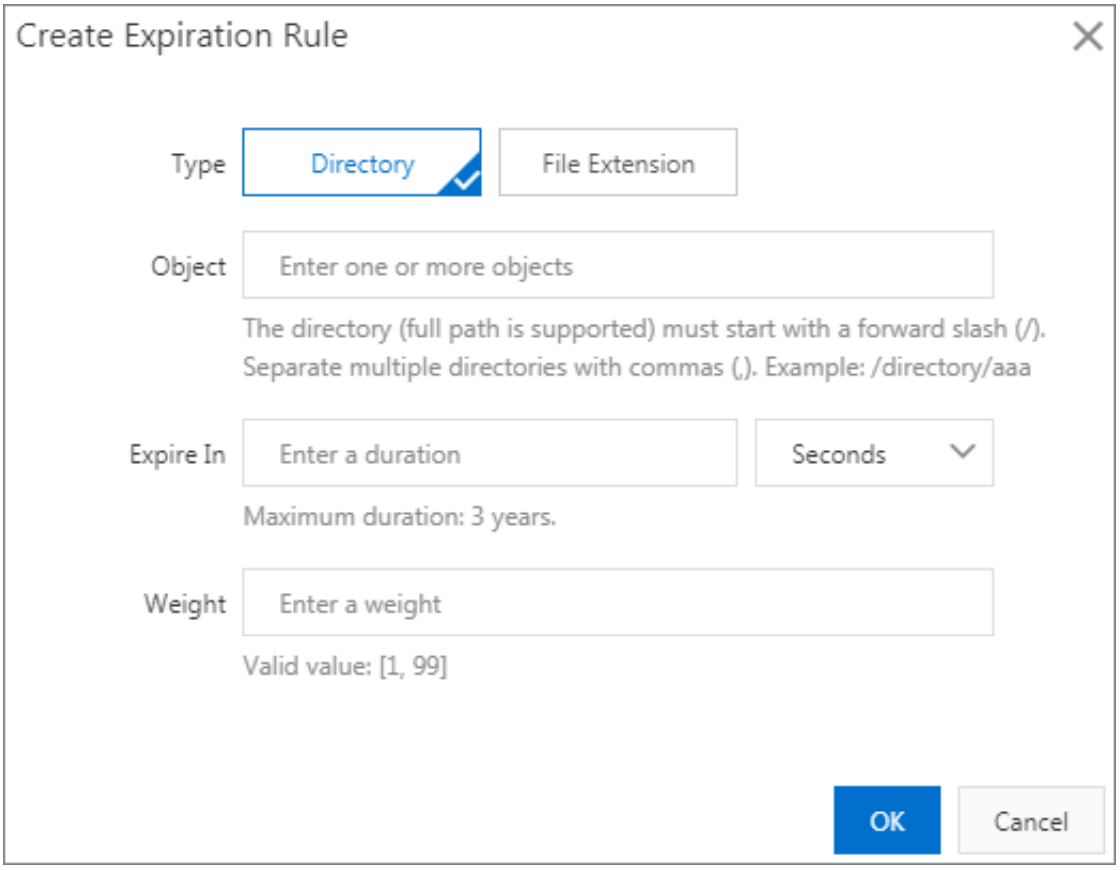
If the origin server is configured with the following response headers, CDN will not cache the resource even if you have configured a cache rule. This is because these response headers have the highest priority in terms of CDN cache rules.

- Any one of s-maxage=0, max-age=0, no-cache, no-store, and private
- s-maxage or s-maxage=0
- Pragma: no-cache

Procedure

1. Log on to the Alibaba Cloud CDN console.
2. In the left-side navigation pane, click Domain Names.
3. On the Domain Names page, find the target domain name and click Manage.
4. In the left-side navigation pane of the specified domain, click Cache.

5. On the Cache Expiration tab, click Create Rule.



6. In the Create Expiration Rule dialog box that appears, select a rule type as prompted.

Parameter	Description
Type	· Directory: specifies resources cached in a specific directory. · File Extension: specifies resources cached in files with specific file extensions.
Object	· When Type is set to Directory, enter a directory name in the Object field. The directory name must start with a forward slash (/), such as `/ directory / aaa` . · When Type is set to File Extension, enter one or more file extensions in the Object field. Multiple file extensions must be separated by using commas (,), such as jpg,txt.

Parameter	Description
Expire In	Specifies the expiration time of the cached resources. The resource retention duration can reach up to three years. We recommend that you set this parameter in compliance with the following rules: · Specify a retention duration of one month or longer for static files such as images and applications that are not frequently updated. · Specify a retention duration based on actual business situations for static files such as files in JS and CSS formats that are frequently updated. · Do not cache dynamic files such as files in PHP, JSP, and ASP formats.
Weight	Specifies the priority of the rule. Note: · The value of this parameter ranges from 1 to 99. A greater value indicates a higher priority, which in turn means that the rule takes effect preferentially. · We recommend that you do not set the same priority for different rules. If different rules have the same priority value , they take effect in a random sequence. For example, if you set the following rules for the `example . aliyun . com` domain, Rule 1 takes effect preferentially over the other two rules: · Rule 1: Type is set to File Extension, Object is set to jpg,png, Expire In is set to 1 Months, and Weight is set to 90. · Rule 2: Type is set to Directory, Object is set to */ www / dir / aaa* , Expire In is set to 1 Hours, and Weight is set to 70. · Rule 3: Type is set to Directory, Object is set to */ www / dir / aaa / example . php* , Expire In is set to 0 Seconds, and Weight is set to 80.

7. Click OK.

3.4 Filter variable parameters in a URL

If the URL of your request includes a *query string* or other variable parameters, CDN may need to retrieve the requested resource from the origin server. In this case, the CDN cache hit rate is reduced. To improve the cache hit rate, you can enable parameter filtering to filter variable parameters in URLs.

Prerequisites

Before you perform the tasks described in this document, make sure that you have completed account registration and real-name authentication with Alibaba Cloud.

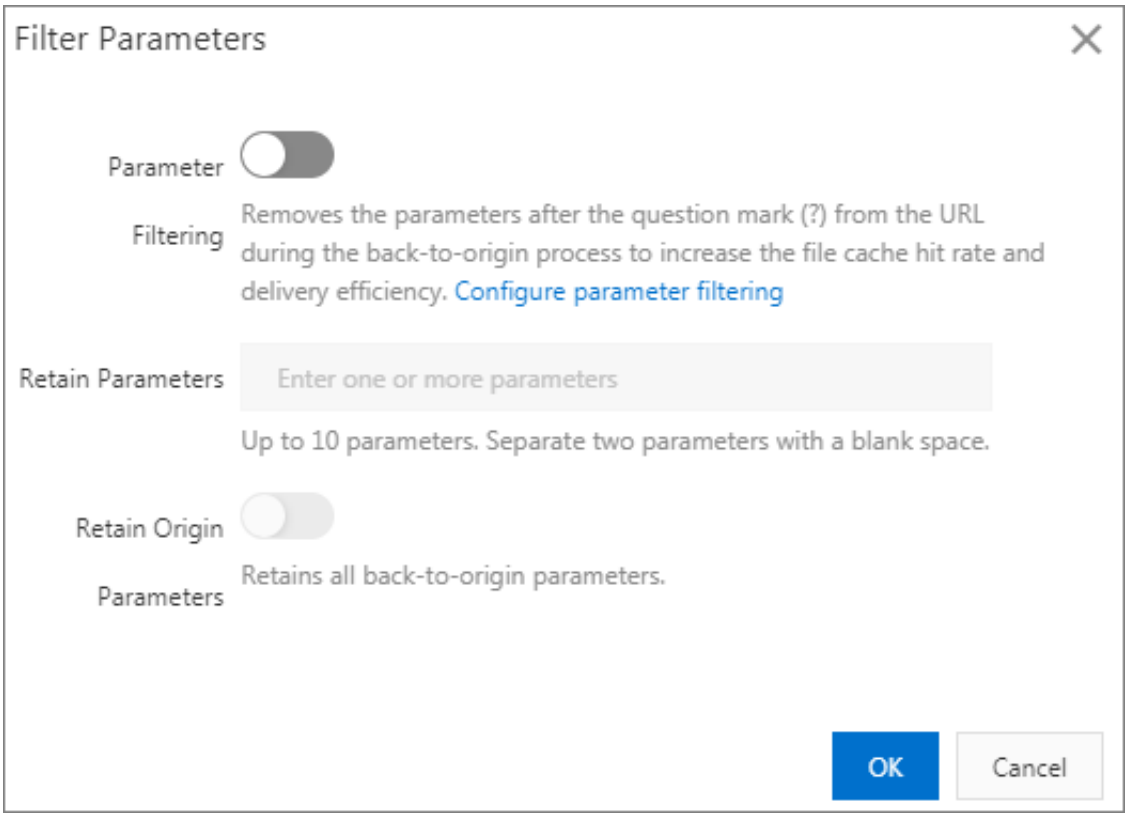
Context

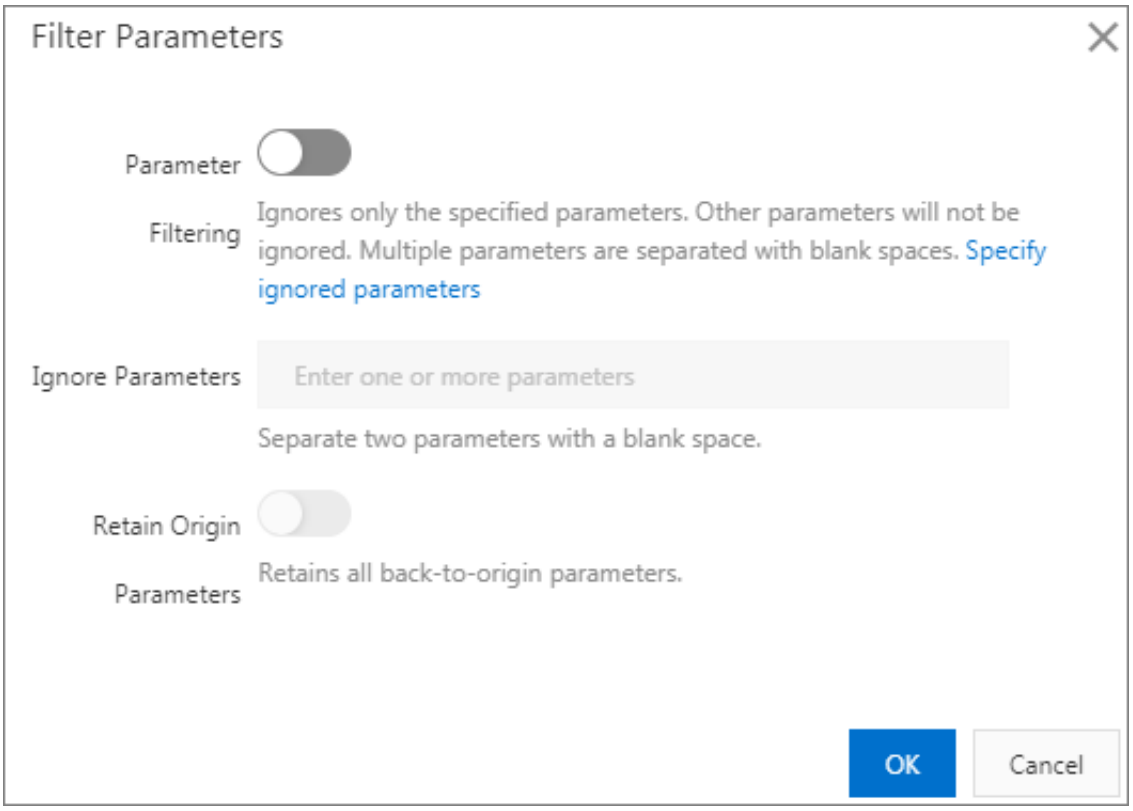
- If you specify an OSS private `bucket` as the origin, the required `OSSAccessKeyId`, `Expires`, and `Signature` parameters are automatically added to the URL of the origin request. In such a case, how CDN processes requests to the URL depends on the *query string*, and these requests may also hit different cache entries. The same is also true when the URL of your request includes the *query string*. If any change occurs to the *query string*, CDN needs to retrieve the requested resource from the origin server. This reduces the CDN cache hit rate. To improve the cache hit rate, you can enable parameter filtering.
- For CDN-based OSS access acceleration, we recommend that you enable the private `bucket` back-to-origin authorization feature. For more information, see #unique_32.

Procedure

1. Log on to the Alibaba Cloud CDN console.
2. In the left-side navigation pane, click Domain Names.
3. On the Domain Names page, find the target domain name and click Manage.
4. In the left-side navigation pane of the specified domain, click Optimization.

5. **In the Parameter Filtering section, click Modify below Retain Parameters or Ignore Parameters.**





6. Turn on Parameter Filtering and set Retain Parameters or Ignore Parameters.
   You can also choose to turn on Retain Origin Parameters based on your business requirements.
   - Retain Parameters

Parameter	Description
Parameter Filtering	The switch used to retain parameters. After the Parameter Filtering switch is turned on, the parameters that follow question marks (?) in the URL are filtered out during the back-to-origin process. This helps increase the file cache hit rate.
Retain Parameters	The parameters to be retained. Up to 10 parameters can be configured. Separate multiple parameters with commas (,).
Retain Origin Parameters	The switch used to retain origin parameters. After the `Retain Origin Parameters` switch is turned on, all parameters are retained during the back-to-origin process.

   - Ignore Parameters

Parameter	Description
Parameter Filtering	The switch used to ignore parameters. After the Parameter Filtering switch is turned on, the specified parameters are ignored during the back-to-origin process. Unspecified parameters are not ignored.
Ignore Parameters	The parameters to be ignored. Up to 10 parameters can be configured. Separate multiple parameters with spaces.
Retain Origin Parameters	The switch used to retain origin parameters. After the `Retain Origin Parameters` switch is turned on, all parameters are retained during the back-to-origin process.

7. Click OK.