Alibaba Cloud Web Application Firewall

User Guide

Issue: 20190517

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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}`

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1 Overview

This topic describes common operations and best practices for activating and using Web Application Firewall (WAF), and helps you learn about WAF and its configuration procedure.

How to use WAF

Web Application Firewall (WAF) helps you monitor HTTP and HTTPS requests to your website and implement access control. WAF supports custom ACL rules and provides multiple built-in scenario-based protection features.

Configuration procedure:

1. *Activate WAF* and *configure WAF for your website* to redirect requests that are sent to your website to WAF for monitoring.
2. After you have configured WAF for your website, *specify WAF protection policies*. WAF detects and filters malicious requests to your website based on the specified protection policy. Only valid requests are allowed to access the origin server.
3. After WAF is enabled, you can *view WAF security reports* to learn about security details and risks. You can also configure *WAF settings* to view WAF resource usage status and adjust alarm settings.
4. You can use *WAF best practices* to improve security management, or *contact technical support*.

Activate WAF

WAF supports the Subscription billing method. When you use the Subscription billing method, you are billed on a monthly or annual basis. After you choose a Subscription plan, the payment must be settled immediately. WAF services are available during the valid subscription period.

After you activate WAF, you will obtain a WAF instance and a WAF IP address. This WAF instance provides protection for up to 10 domains. These domains must use the same top-level domain.

Related topics

- *WAF billing methods*
- *Activate Web Application Firewall*

- *WAF renewal and upgrade*
- *Disable Web Application Firewall*

WAF instance specifications

- *Subscription plans*

  Web Application Firewall offers three Subscription plans: Advanced, Enterprise, and Flagship. You can select an appropriate Subscription plan based on your Web business scale and actual protection requirements.

- *Extra bandwidth*

  Before you choose a WAF Subscription plan, you need to evaluate your normal business traffic to separate normal traffic from unusual traffic, such as DDoS attacks. Different Subscription plans support different bandwidth conditions. If your actual business traffic exceeds the upper limit offered by the plan, you must purchase extra bandwidth.

- *Extra domain quotas*

  If you need to protect domain names that use different top-level domains, you must purchase extra domain quotas.

- *Exclusive WAF IP addresses*

  If you need exclusive protection for an important domain, instead of using one WAF IP address to protect all domains, you can purchase an exclusive WAF IP address.

Configure WAF

After you activate WAF, you can use the transparent proxy mode or DNS proxy mode to configure WAF for your website.

Notice:
You can choose either mode to configure WAF. If you choose the transparent proxy mode, clear the website configuration that you have set for the DNS proxy mode. If you choose the DNS proxy mode, clear the website configuration for the transparent proxy mode.

- Transparent proxy mode: This mode directs HTTP requests that are received on port 80 of the specified origin server to WAF. WAF processes the requests and then redirects the requests to the origin server.

  To use this mode, you must authorize WAF to access the ECS instances where your services are deployed. To configure this mode, add a domain and specify the IP address of the server that hosts your website in the WAF console.
- DNS proxy mode: This mode directs requests that are sent to the protected domain to WAF based on the specified DNS record. WAF then processes and redirects the requests to the specified origin server.

  In DNS proxy mode, you must add website configuration and specify the domain that needs protection in the WAF console. Requests sent to the website are directed to WAF for monitoring based on *DNS settings*.

  - Add website configuration: Website configuration specifies the domain that needs protection and the origin server IP address. WAF can automatically add website configuration. You can also manually add website configuration. You must specify required information including the domain name of the website that needs protection and the IP address of the server that hosts the website in the website configuration. After you add website configuration, WAF assigns an exclusive *CNAME record* for the domain name.

    Note:
    If you use *Alibaba Cloud DNS* to translate your domain name, website configuration is automatically added. Otherwise, you need to manually add website configuration and change the DNS record.
  - Change the DNS record: Only after you have added and enabled the WAF CNAME record for the specified domain name, requests sent to the website can be redirected to WAF for monitoring.

After you configure WAF for your website, WAF can filter out malicious requests. Only valid requests are allowed to access the origin server.

Related topics

- *Use the transparent proxy mode to configure WAF*
- *Website configuration (DNS proxy mode)*
- *Configure DNS settings (DNS proxy mode)*

Configure protection policies

Alibaba Cloud WAF offers multiple protection policies. You can adjust your protection policies based on your actual needs.

You can create custom ACL rules or use the built-in protection features. The Web Application Firewall team wrote the filtering algorithms based on attacks patterns and analysis of request headers and request bodies, and encapsulated the algorithms into the protection features for efficient use.

Note:
WAF uses a multi-layer filtering mechanism. After you enable WAF and configure a protection policy, a request sent from a client to WAF has been filtered on multiple layers. Default detection sequence: Access Control > HTTP Flood Protection > Web Application Protection.

Related topics

- *HTTP ACL policy* and *Configure a whitelist or blacklist*

  Custom access control rules allow WAF to filter requests based on client IP addresses, request URLs, and common request header fields.
- *Web application protection*

  This feature protects your Web applications against common Web attacks, such as SQL injection and XSS attacks.
- *HTTP flood protection* and *Custom HTTP flood protection*

  These features protect your Web applications against HTTP floods.
- *New intelligent protection engine*

  This feature performs semantic analysis on requests, detects malicious requests, and protects your Web applications against attacks such as confusion attacks and attack variants.
- *Malicious IP blocking*

  This feature automatically blocks a client IP address that has launched multiple attacks on your website in a short period of time.

- *Blocked regions*

  This feature blocks access requests based on the geographic location of the client's IP address and supports blocking all requests from one or more specified Chinese provinces or other countries or regions.

- *Antifraud Service*

  This feature protects your Web applications against bot attacks such as zombie accounts, account theft, vote cheating, and spam messages.

- *Webpage defacement protection*

  This feature can lock specified webpages to avoid content tampering. When a locked webpage receives a request, only the cached page that you have set is returned.

- *Data leakage prevention*

  This feature masks sensitive information in the response returned by the server, such as the ID number, bank card number, telephone number, and sensitive words .

Security reports

Web Application Firewall provides visualized data and statistics for you to learn about your business status and security statistics.

Related topics

- *Overview*

  View business QPS data and security protection statistics.

- *Security reports*

  Search for attack details and risk warnings on your domain name within 30 days.

- *Full logs*

  Search for your website logs and use online analysis to quickly locate requests.

  Note:
  You must enable the Log Query feature on the Website Configuration page for the domain name for WAF to collect access logs for a specified domain name.

WAF settings

You can learn about WAF resources and manage alarm settings and custom rule groups on the Settings page.

Related topics

- *View product information*

  You can view resource details of your WAF instance, updates on WAF protection policies and features, and WAF back-to-origin CIDR block.
- *Alarm settings*

  WAF informs you about security events and system alarms through emails or SMS. You can configure the alarm triggering condition, alarm interval, and the method to receive alarms.
- *Custom rule groups*

  A rule group is a combination of the built-in protection rules of WAF that make up a protection policy for a specific protection feature. You can create and use a custom rule group for a specific protection feature of WAF to suit your needs.

Best practices

Best practices help you improve the management and use of WAF.

Related topics

- *Obtain authentic client IP address*

  After you configure WAF for a website, all requests that are received by the origin server are redirected by WAF. The IP addresses of the clients that initiate the requests are not displayed. This topic describes how to obtain the real IP address that initiates the request to your origin server.
- *Protect your origin server*

  After WAF is activated, the origin server IP address is not visible to the client. If your origin server IP address is exposed or unintentionally disclosed, attackers can bypass WAF and launch attacks on your origin server. This topic describes how to configure protection features to protect your origin server.

- *Deploy WAF and Anti-DDoS Pro together*

  If you have activated Alibaba Cloud *Anti-DDoS Pro* and Web Application Firewall, you can follow the procedures in this topic to complete the configuration.

- *Deploy WAF and CDN together*

  If you have activated Alibaba Cloud*CDN* and Web Application Firewall, you can follow the procedures in this topic to complete the configuration.

Technical support

If you experience any problems while using Web Application Firewall, hover over the Technical Support icon in the left-side navigation pane in the *WAF console*. A DingTalk QR code is displayed.

Scan the QR code with DingTalk to join the technical support group to consult the experts on any technical problems or urgent issues.

> **Note:**
> You can download DingTalk on the *DingTalk website*.

2 Use the transparent proxy mode to implement WAF

The transparent proxy mode is a more efficient method to configure Alibaba Cloud WAF (Web Application Firewall) for your site. This topic describes how to use the transparent mode to implement WAF.

Prerequisites

To use the transparent proxy mode, you must meet the following requirements:

- The billing method of WAF instances must be Subscription.
- The origin server must be deployed on Alibaba Cloud Elastic Compute Service (ECS). The ECS instance can only be created in the China (Qingdao), China (Beijing), China (Zhangjiakou), and China (Hohhot) regions.
- The ECS instance where the origin server is deployed must have a public IP address, or is associated with an EIP address.

> Note:
> The transparent proxy mode does not support redirecting ECS traffic through a public IP address of a Server Load Balancer (SLB) instance.

Context

You can configure WAF for a website by using the transparent proxy mode or the DNS proxy mode.

> Notice:
> You can only choose one of these modes. If you choose the transparent proxy mode, you must clear the website configuration that you have set for the DNS proxy mode. If you choose the DNS proxy mode, you must clear the website configuration that you have set for the transparent proxy mode.

- Transparent proxy mode: This mode directs HTTP requests that are received on port 80 of the specified origin server to WAF. WAF processes the requests and then redirects the requests to the origin server.

  To use this mode, you must authorize WAF to access the ECS instance where your origin server is deployed. To configure this mode, add a domain and specify the

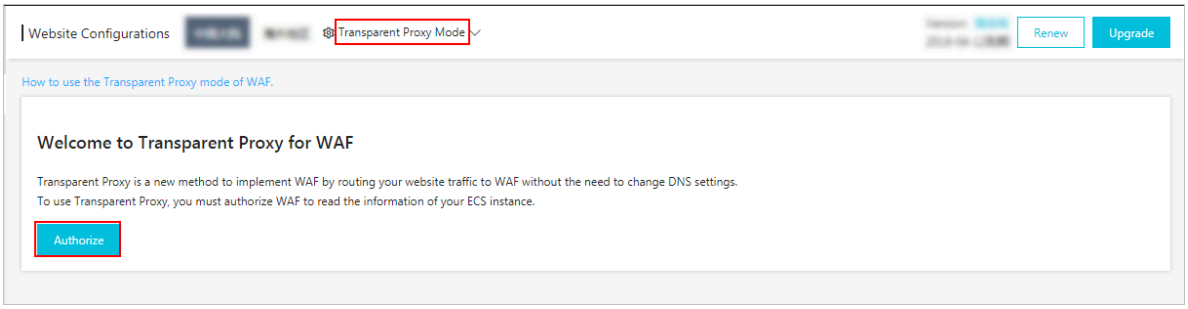
IP address of the server that hosts your website in the WAF console. For more information about how to configure this mode, see the following section.

- DNS proxy mode: This mode directs requests that are sent to the protected domain to WAF based on the specified DNS record. WAF then processes and redirects the requests to the specified origin server.

  This mode requires you to add a website configuration in the WAF console and update DNS settings of the domain. For more information, see *Website configuration* and *Update DNS settings*.

Procedure

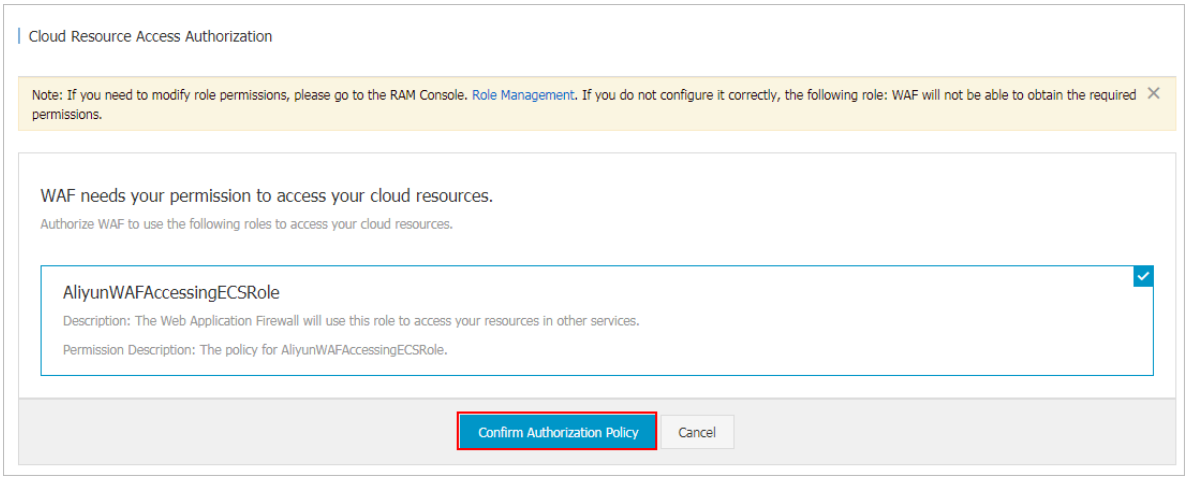
1. Log on to the *Alibaba Cloud WAF console*.
2. In the left-side navigation pane, click Management > Website Configuration.
3. Select Transparent Proxy Mode.



4. Optional: Click Authorize.

> **Note:**
> If this is the first time that you have used the transparent proxy mode, you must authorize WAF to access the ECS instance. If you have already authorized WAF, skip this step and perform *step 6*.

5. Optional: On the Cloud Resource Access Authorization page, click Confirm Authorization Policy.

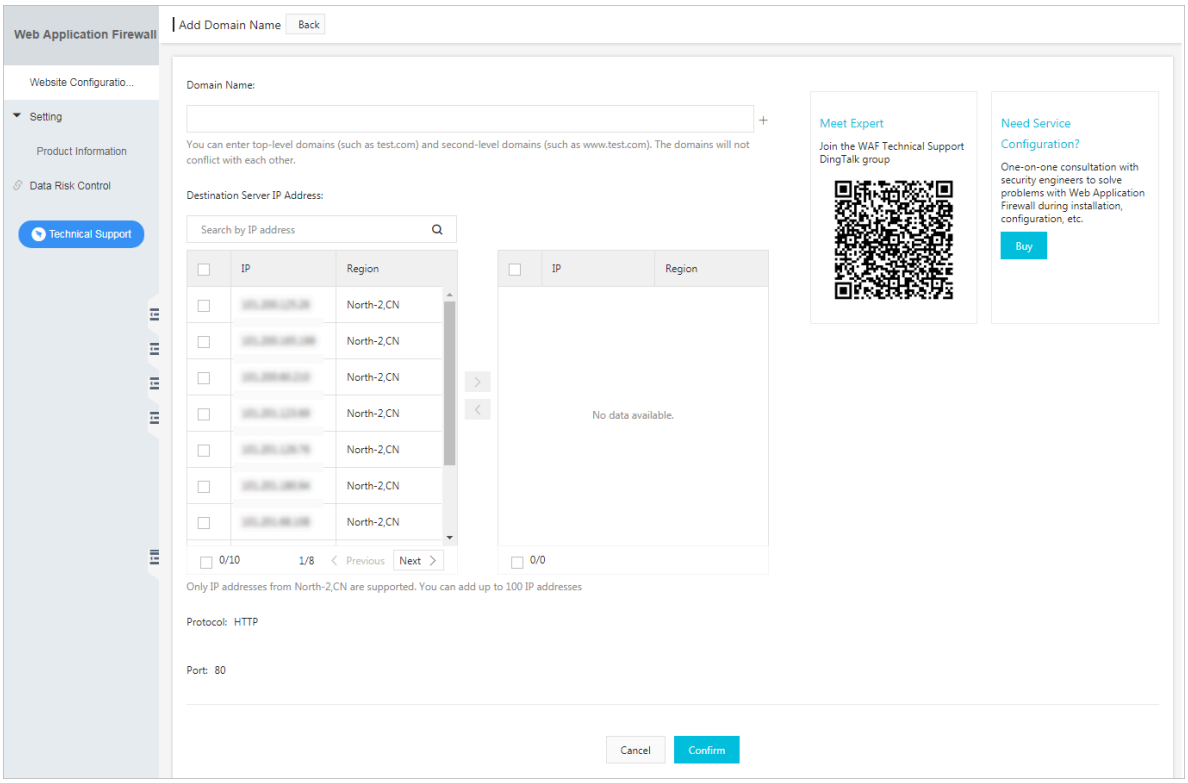


You will be directed to the Add Domain Name page after you authorize WAF. Perform *step 7*.

6. Optional: Click Add Domain Name.
7. On the Add Domain Name page, specify the domain that needs protection. In the left-side Destination Server IP Addresses list, select the origin server IP address of the domain.

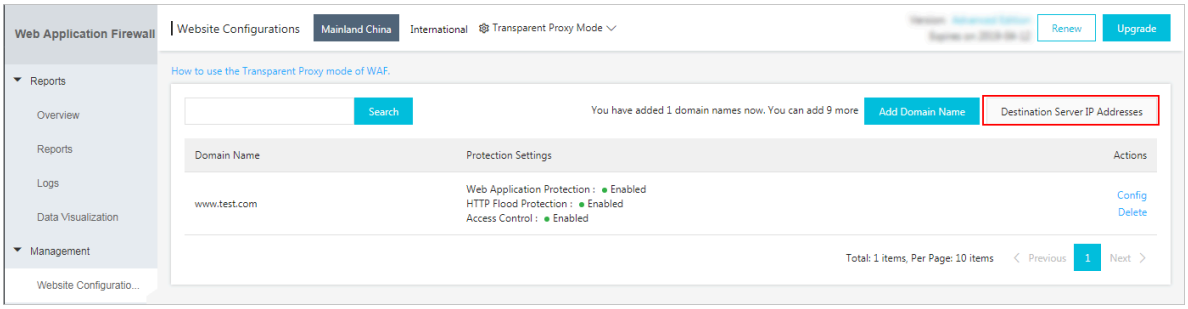
> **Note:**
> HTTP requests that are received on port 80 of the selected IP address will be directed to WAF for analysis and processing. WAF detects the HTTP requests

based on the protection policy that you have set, and then redirects the requests to the origin server.



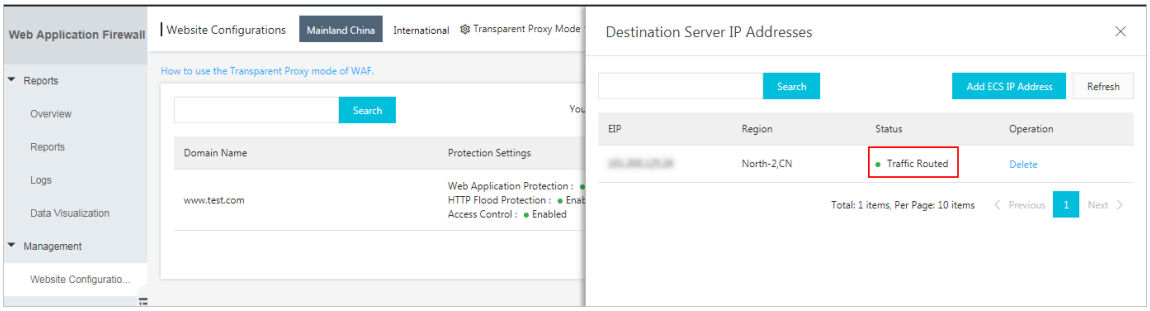
8. Verify that the configuration is correct and click Confirm. The domain has been added.

   After a domain is added, request redirection is triggered automatically. You can view the status of the server IP addresses that you have specified on the Destination Server IP Addresses page.



   Status description:

   - Traffic Routed: This status indicates that all requests received on port 80 of the specified IP address are redirected automatically to WAF.



   - Routing Traffic: This status indicates that requests are being redirected.
   - Route Failed: This status indicates that an error occurred while redirecting requests.
   - Deleting: This status indicates that the IP address is being removed.

   If you no longer need to redirect requests for a server IP address, you can delete it on the Destination Server IP Addresses page.

> **Note:**
> To disable request redirection, you must delete the website configuration on the Website Configurations page and the server IP address on the Destination Server IP Address page.

What's next

After you configure WAF for your website by using the transparent proxy mode, specify the protection policy for your domain. For more information, see *WAF features*.

3 Use the DNS proxy mode to configure WAF

3.1 Website configuration

A website configuration specifies the request redirect routes for the website for which you have configured Web Application Firewall (WAF). You must specify the website configuration in the WAF console. This topic describes how to add and manage website configurations when you use the DNS proxy mode to configure WAF for your website.

Note:

You can use the transparent proxy mode to configure WAF for your website if your origin server is deployed on an ECS instance. The ECS instance must be created in the China (Qingdao), China (Beijing), China (Zhangjiakou), or China (Hohhot) region, and have a public IP address or be associated with an EIP.

- Transparent proxy mode: This mode directs HTTP requests that are received on port 80 of the specified origin server to WAF. WAF processes the requests and then redirects the requests to the origin server.

  To use this mode, you must authorize WAF to access the ECS instance where your origin server is deployed. To configure this mode, add a domain and specify the IP address of the server that hosts your website in the WAF console. For more information, see *Use the transparent proxy mode to configure WAF*.
- DNS proxy mode: This mode directs requests that are sent to the protected domain to WAF based on the specified DNS record. WAF then processes and redirects the requests to the specified origin server.

  In DNS proxy mode, you must add the website configuration of your website in the WAF console and change the DNS record of the domain name.

When you use the DNS proxy mode to configure WAF, you can choose to *add website configurations automatically* or *add website configurations manually*.

- Add website configurations automatically When you add website configurations, WAF can automatically read the A record from the *Alibaba Cloud DNS console* and obtain the domain name of your website and the origin server IP address. After

WAF obtains this information, it automatically adds the website configuration. After the website configuration is added, WAF automatically updates the DNS record of the domain name to complete the configuration of WAF for your website.

- Add website configurations manually If your DNS records are not managed by Alibaba Cloud DNS, you need to add website configurations manually and change DNS records at your DNS service provider to redirect requests to WAF for monitoring.

  For more information about updating DNS settings, see *Configure DNS settings*.

> Note:
> The number of website configurations that you can add on the Website Configuration page depends on your WAF instance specification and extra domain quota. For more information, see *Extra domain quota*.

If the configuration of your website such as the server address, protocol type, or server port is changed, or you need to modify advanced HTTPS settings, *edit the website configuration* of your website.

If you no longer need to redirect requests for a domain name, you can restore the DNS settings and then *delete the website configuration*.

Add website configurations automatically

Prerequisites

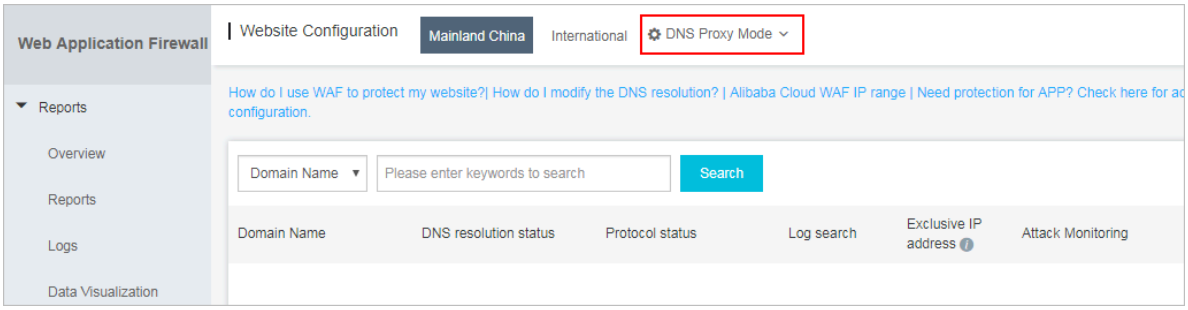
- The DNS records of the website are managed by Alibaba Cloud DNS, and at least one A record is valid.

  If you cannot host your domains on Alibaba Cloud DNS, you must manually add website configurations. For more information, see *Website configuration*.
- (Mainland China regions) You have obtained an ICP license for the website.
- (HTTPS-based websites) You have obtained the HTTPS certificate and the private key file of the website, or the HTTPS certificate is managed by Alibaba Cloud SSL Certificates Service.

Procedure

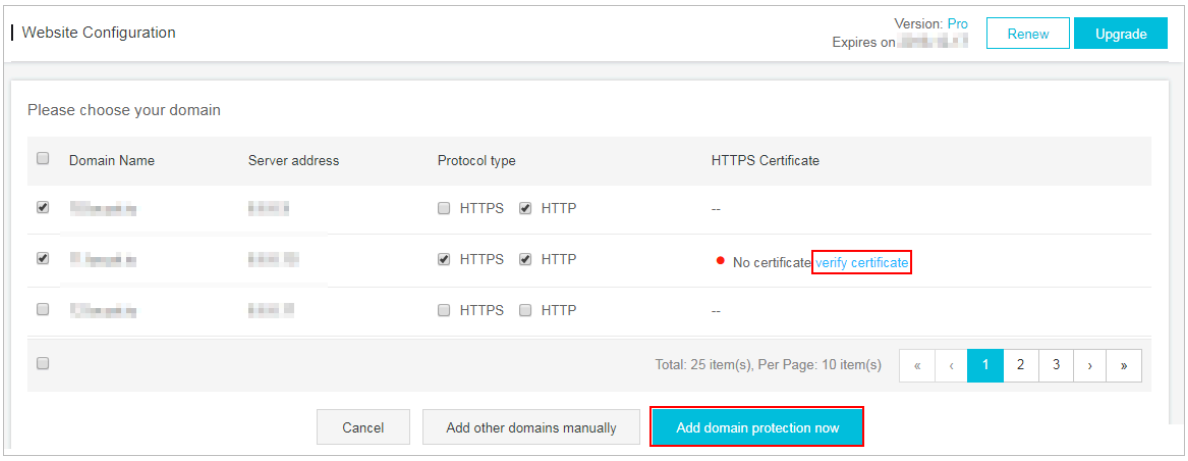
1. Log on to the *WAF console*.
2. On the top of the page, select Mainland China or International.

3. Choose Management > Website Configuration and select DNS Proxy Mode.



4. Click Add Domain.

   WAF automatically lists the domain names that have an A record configured on Alibaba Cloud DNS under the current Alibaba Cloud account. If you have not created an A record on Alibaba Cloud DNS, the Please choose your domain page will not appear. You can manually add the website configuration by following the procedure described in *Website configuration*.



5. On the Please choose your domain page, choose the domain name and the protocol type for the website.
6. (Optional) If you choose HTTPS, you must verify the certificate before you add the website configuration.

Note:

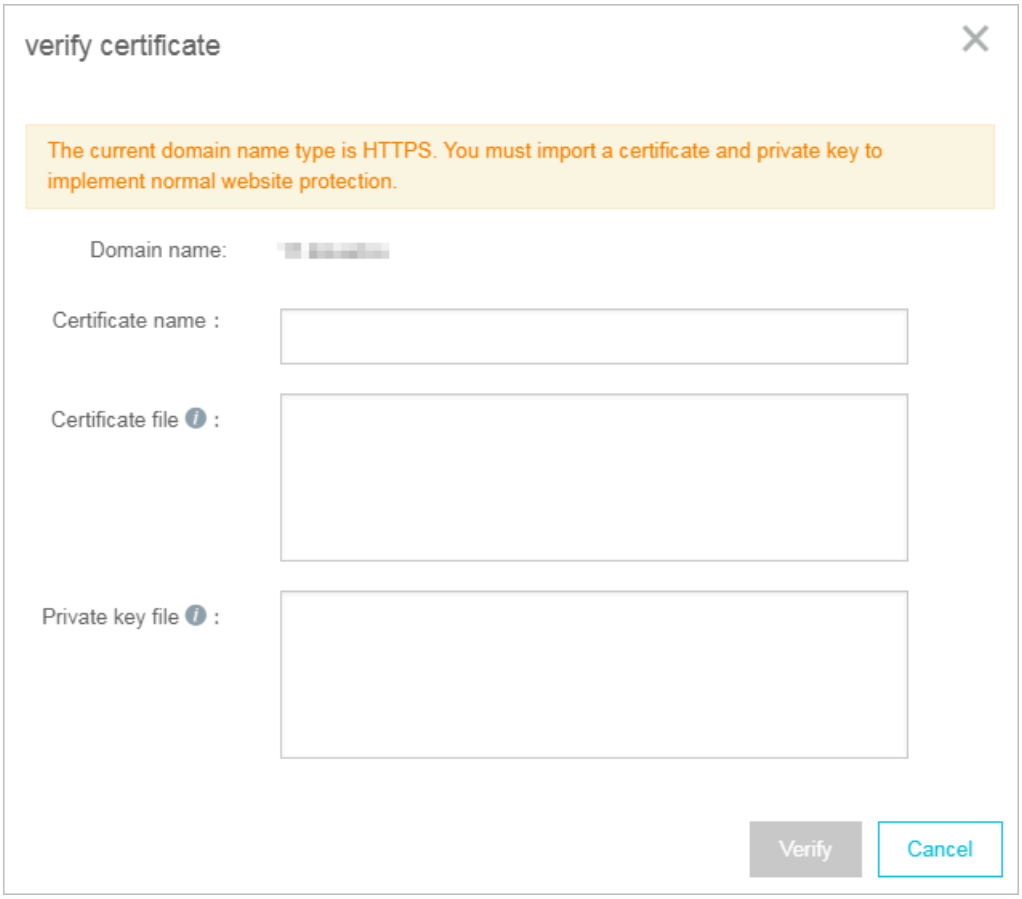
Alternatively, do not select HTTPS. After you have added the website configuration, upload the HTTPS certificate by following the procedure described in *Update HTTPS certificates*

a. Click Verify Certificate.

b. In the Verify Certificate dialog box, upload the certificate and private key file.

- If you have hosted your certificates on *Alibaba Cloud SSL Certificate Service*, click Select Existing Certificate in the Verify Certificate dialog box, and select the certificate that is associated with the domain name.
- Manually upload the certificate. Click Manual Upload, enter the certificate name, and copy the text content of the certificate and private key files to the Certificate File and Private Key File fields respectively.

  For more information, see *Update HTTPS certificates*.



c. Click Verify to verify the uploaded certificate.

7. Click Add domain protection now.

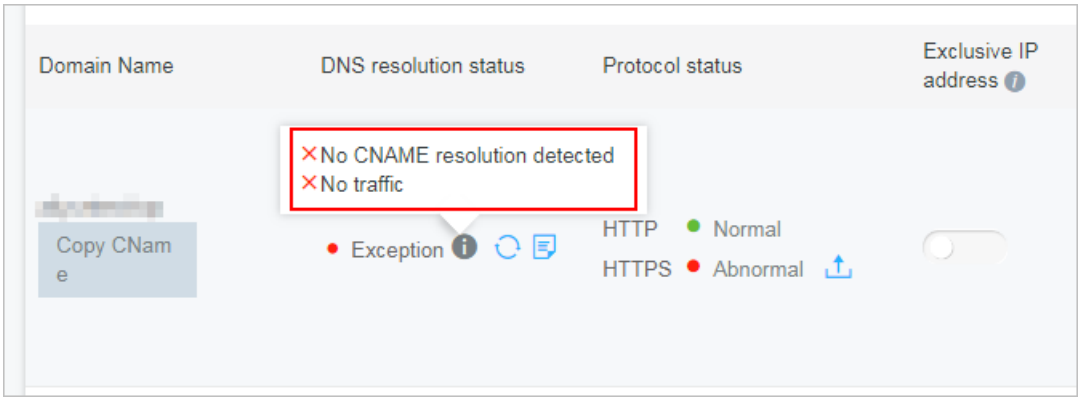
   After you have added the website configuration, WAF automatically updates the CNAME record of the domain to redirect requests sent to your website to WAF for monitoring. This operation will take 10 to 15 minutes.

   > Note:
   > If you are required to add DNS records manually, follow the procedure described in *Step 2: Update the DNS settings* to complete the configuration.

8. You can choose Management > Website Configuration to view the domain name that you have added and the DNS status in the DNS resolution status column.

   - Normal indicates that you have successfully configured WAF for your website. You can follow the procedure described in *Step 3: Configure WAF protection policies* to specify protection policies.
   - Exception may be displayed after you have added the website configuration. Wait a few seconds and check the DNS status again, or check whether the DNS settings are configured correctly at your DNS service provider.

     If the DNS settings are not configured correctly, see *Step 2: Update the DNS settings*. For more information, see *DNS resolution status exception*.



Add website configurations manually

Prerequisites

- You have obtained the domain name of the website that needs protection.
- You have obtained the origin server IP address of the website.
- Check whether you have configured other proxy services such as Alibaba Cloud CDN and Alibaba Cloud Anti-DDoS Pro, or whether you will need to configure such services.

- If your website is deployed in a Mainland China region, make sure that you have obtained an ICP license.
- For an HTTPS-based website, you must obtain the HTTPS certificate and the private key file, or host your certificate on Alibaba Cloud SSL Certificates Service.

Procedure

1. Log on to the *WAF console*.
2. On the top of the page, click Mainland China or International.
3. Choose Management > Website Configuration and select DNS Proxy Mode.
4. Click Add Domain.

   WAF automatically lists all domain names that have an A record configured on Alibaba Cloud DNS under the current Alibaba Cloud account. If no A records have been created on Alibaba Cloud DNS, the Choose your domain page will not appear.
5. On the Choose your domain page, click Add other domains manually.
6. On the Fill in the website information page, complete the following configuration.

Parameter	Description
Domain name	Enter the domain name that needs WAF protection. Note: · Supports wildcard domains, such as `*. aliyun . com`. WAF automatically matches all subdomains for the wildcard domain. · If you enter a wildcard domain and a specific domain name, such as `*. aliyun . com` and `www . aliyun . com`, WAF will use the redirection rules and protections policies of the specific domain name. · Currently, .edu domain names are not supported. If you need to use a .edu domain name, submit a ticket to Alibaba Cloud technical support.

Parameter	Description
Protocol type	Select a protocol type. Valid values: HTTP and HTTPS. Note: · If your website supports HTTPS, select HTTPS and upload the certificate and the private key file after you add the website configuration. For more information, see *Update HTTPS certificates*. · After you select HTTPS, click Advanced settings to enable HTTP force redirect and HTTP back-to-origin to ensure efficient access to your website. For more information, see *HTTPS advanced settings*.
Server address	Enter the origin server IP address of the website. IP addresses and other formats of addresses are supported. WAF will filter and redirect requests to the server address. · (Recommended) Select IP and enter the public IP address of the origin server, such as the IP address of the ECS or SLB instance. Note: - Separate multiple IP addresses with commas (,). You can enter up to 20 server IP addresses. - If you enter multiple IP addresses, WAF automatically performs health check and load balancing on these addresses when WAF redirects requests. For more information, see *Load balance across multiple origin IPs*. · Select Other addresses and enter the back-to-origin domain name of the server, such as an OSS CNAME address. Note: - The back-to-origin domain name and the domain name of the protected website must be different. - If you enter an OSS CNAME address for your origin server, you must associate a custom domain name with the OSS CNAME address in the OSS console after you set the website configuration. For more information, see *Attach a custom domain name*.

Parameter	Description
Server port	Specify the server port. After you configure WAF for your website, WAF will redirect filtered requests to this port. · If you select HTTP, the default port is 80. · If you select HTTPS, the default port is 443. · If you need to use other ports, click Custom to add ports. Note: For more information, see *Supported non-standard ports*. Notice: The protocol and the port must be the same as those of the origin server IP address. You cannot change the port after it is specified.
Any layer 7 proxy (e.g. Anti-DDoS/ CDN) enabled?	Select yes or no based on the actual status of your website. If you need to configure a layer 7 proxy to redirect requests before WAF, select yes. Otherwise, WAF cannot obtain the real IP addresses of clients that initiate requests to your website.
Load balancing algorithm	When multiple origin server addresses are specified, select IP hash or Round-robin. WAF will distribute requests to these servers based on the specified algorithm to balance the load.
Flow mark	Enter an unoccupied Header Field name and a custom Header Field Value to mark the requests that are redirected to the origin server by WAF. WAF adds the specified header field into the filtered requests for your backend server to identify the requests that are redirected by WAF. Note: If the requests to your website already contain a specified header field, WAF overwrites the original field value with the specified value.

7. Click Next to complete the configuration.

   You can perform the following operations after you configure WAF.

   - Enter required information on the Change DNS Record page by following the prompts. For more information, see *Configure DNS settings*.
   - If you select HTTPS as the protocol type, upload the HTTPS certificate and the private key file. For more information, see *Update HTTPS certificates*.
   - Choose Management > Website Configuration to view the website configuration that you have added. You can edit or delete it based on your actual needs.

Edit website configurations

If the configuration of your website such as the server address, protocol type, or server port is changed, or you need to configure advanced HTTPS settings, edit the website configuration of your website.

Procedure

1. Log on to the *WAF console*.
2. On the top of the page, select Mainland China or International.
3. Choose Management > Website Configuration, select DNS Proxy Mode, and click Edit to modify the website configuration for the specified website.
4. On the Edit page, perform *step 6* described in the Add website configurations manually section to modify the configuration.

   Note:
   You cannot change the domain name. If you want to configure WAF for a different domain, we recommend that you add a domain and set a website configuration for it, and delete the configuration that you no longer need.

5. Click OK to delete the configuration.

Delete website configurations

If you want to disable WAF for your website, you can restore the DNS settings to redirect requests to the origin server, and delete the website configuration in the WAF console.

Procedure

1. Log on to the *WAF console*.

2. On the top of the page, select Mainland China or International.
3. Choose Management > Website Configuration, select DNS Proxy Mode, and click Delete to delete the website configuration.

   Note:
   You must restore the DNS settings before deleting the website configuration. Otherwise, the website may become inaccessible.
4. In the prompt message, click OK. The website configuration has been deleted.

3.2 Configure DNS settings

This topic describes how to configure DNS settings to activate Web Application Firewall (WAF) for your business after you add a website configuration under the DNS proxy mode.

Note:
You can use the transparent proxy mode to configure WAF for your website if your origin server is deployed on an ECS instance. The ECS instance must be created in the China (Qingdao), China (Beijing), China (Zhangjiakou), or China (Hohhot) region, and have a public IP address or be associated with an EIP.

- Transparent proxy mode: This mode directs HTTP requests that are received on port 80 of the specified origin server to WAF. WAF processes the requests and then redirects the requests to the origin server.

  To use this mode, you must authorize WAF to access the ECS instances where your origin server is deployed. To configure this mode, add a domain and specify the IP address of the server that hosts your website in the WAF console. For more information, see *Use the transparent proxy mode to configure WAF*.
- DNS proxy mode: This mode directs requests that are sent to the protected domain to WAF based on the specified DNS record. WAF then processes and redirects the requests to the specified origin server.

  This mode requires you to add a website configuration in the WAF console and update DNS settings of the domain.

When you use the DNS proxy mode to configure WAF for your website, you must *add a website configuration* first. After you add the website configuration, you can *edit CNAME*

records or *A records* to update the DNS settings to redirect requests that are sent to your website to WAF for monitoring.

Note:

We recommend that you use CNAME records. If an error occurs, such as node failures or failures in a server room, CNAME records allow WAF to use another WAF IP address, or direct the requests to the origin server directly. This keeps your business running normally and increases high availability and disaster recovery capabilities.

The following sections describes how to configure WAF for a website that does not use CDN, Anti-DDoS Pro, or other proxy services. For more information about deploying multiple proxy services, see the following topics:

- *Deploy WAF and CDN together*: This topic describes how to deploy CDN and WAF for your website.
- *Deploy WAF and Anti-DDoS Pro together*: This topic describes how to deploy Anti-DDoS Pro and WAF for your website.

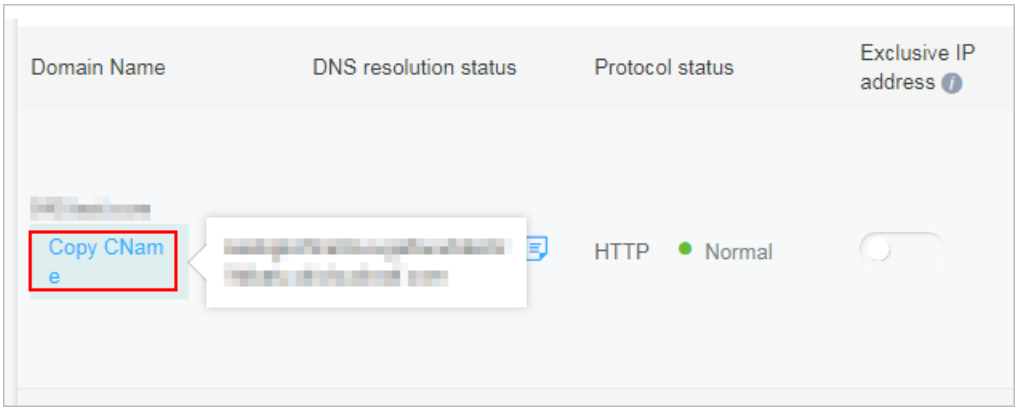
(Recommended) Use CNAME records to deploy WAF

Prerequisites

- You have added the website configuration for your website. For more information, see *Website configuration*.

- You have obtained the WAF CNAME address.

  1. Log on to the *Alibaba Cloud WAF console*.
  2. On the top of the page, select Mainland China or International.
  3. Choose Management > Website Configuration and select DNS Proxy Mode. Select the website configuration and hover over the domain name. A Copy CName button appears.



  4. Click Copy CName to copy the WAF CNAME address.

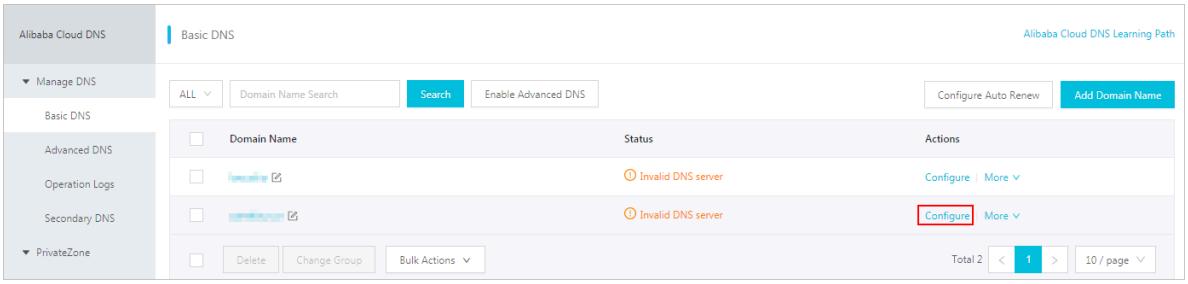
> Note:
> If you want to use an A record to redirect requests to WAF, ping this CNAME address to obtain the corresponding WAF IP address. For more information, see *Set DNS settings*. The IP address of the WAF instance that protects your website changes infrequently.

- You have permissions to update the domain DNS settings at your DNS service provider.
- (Optional) Whitelist WAF back-to-origin CIDR blocks. If your origin server uses non-Alibaba Cloud security software, such as Safedog and Jowto Lock, you must whitelist the WAF back-to-origin CIDR block to prevent normal traffic redirected to the origin server by WAF from being blocked. For more information, see *Whitelist Alibaba Cloud WAF IP addresses*.
- (Optional) Verify redirection rules. You can use a local computer to verify that the redirection rules are correctly configured before you change the DNS records of your website. This avoids business interruption caused by configuration errors. For more information, see *Perform redirect check with a local computer*.

Procedure

The following example uses Alibaba Cloud DNS to describe how to specify a CNAME record. If your domain is hosted on Alibaba Cloud DNS, perform the following steps to change DNS records. If your domain is not hosted on Alibaba Cloud DNS, perform the following steps to change DNS records at your DNS service provider.

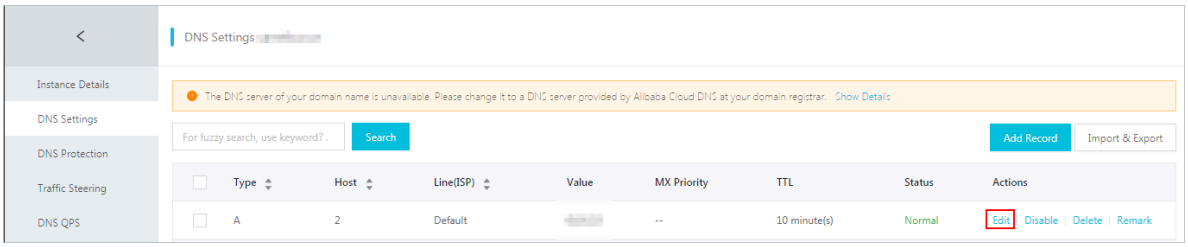
1. Log on to the *Alibaba Cloud DNS console*.
2. Select the domain name and click Configure.



3. Select the specified host (hostname) and click Edit.

   The following example uses `abc . com`:

   - www: Used to select domain names that begin with www, such as `www . abc . com`.
   - @: Matches the root domain `abc . com`.
   - *: Matches all wildcard domains including root domains and subdomains, such as `blog . abc . com`, `www . abc . com`, and `abc . com`.



4. In the Edit Record dialog box, perform the following operations:

   - Type: Select CNAME.
   - Value: Paste the WAF CNAME address that you have copied in the preceding step.
   - Keep the remaining settings unchanged. We recommend that you set the TTL to 10 minutes. A longer TTL indicates that the system takes a longer time to synchronize and update the DNS record.

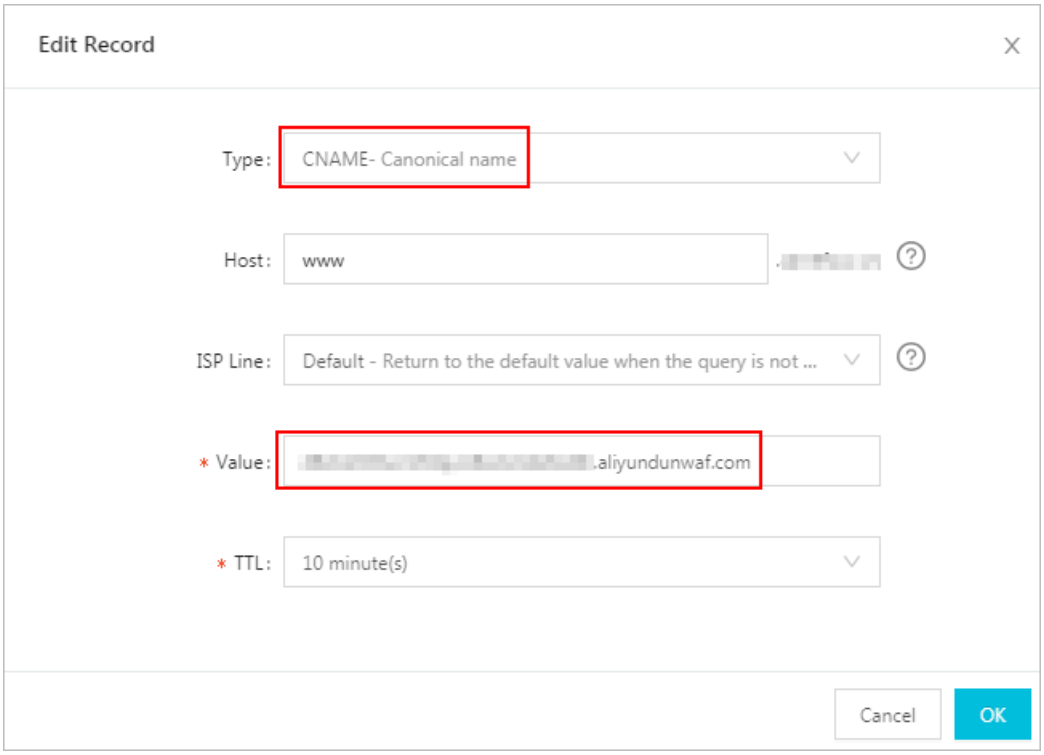
   Notes:

   - You can only specify one CNAME record for each hostname. Change the value to the WAF CNAME address.
   - Different record types conflict with each other. For example, a CNAME record, an A record, an MX record, and a TXT record cannot coexist with each other under the same hostname. If you cannot change the record type, delete all conflicting records, and then add a new CNAME record.

     Note:

You must delete conflicting records and add the new CNAME record in a short period of time. Otherwise, your domain becomes inaccessible.

- If you must keep the MX record, you can use an A record to redirect requests to WAF. For more information, see *Set DNS settings*.



5. Click OK and wait for the DNS record to take effect.
6. (Optional) Verify the DNS settings. Ping the domain or use *DNS Check* to check whether the DNS record takes effect.

Note:
It takes some time for the DNS record to take effect. If the verification fails, verify the DNS record again in 10 minutes.

7. Check the DNS resolution status.

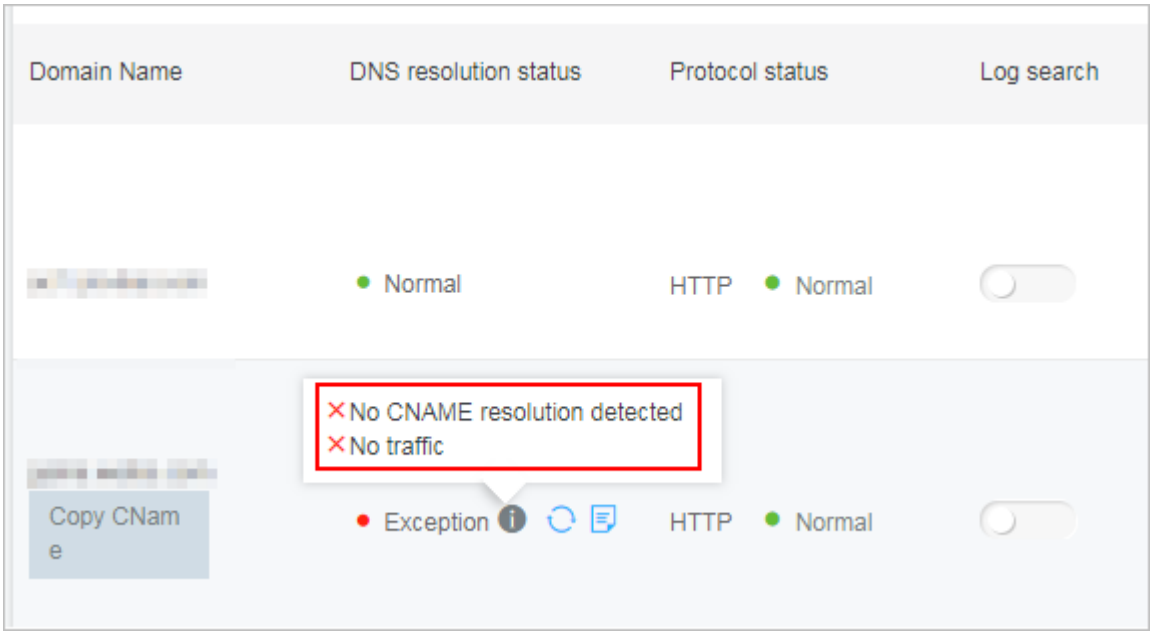
   a. Log on to the *WAF console*.

   b. Choose Management > Website Configuration and select DNS Proxy Mode to view the DNS translation status.

   - Normal indicates that WAF has been successfully configured for your website. All requests that are sent to your website are redirected to WAF for monitoring.
   - Exception indicates that you have not correctly configured WAF for you website if the following error messages appear: No CNAME resolution detected, No traffic, and DNS check failed.

     If you confirm that the DNS settings are correct, check the DNS translation status again in an hour, or troubleshoot the errors. For more information about troubleshooting, see *DNS resolution status exception*.

     Note:
     The error message, as shown in the following figure, only indicates whether you have correctly configured WAF for your website. It does not indicate whether your website is accessible.



Protect the origin server

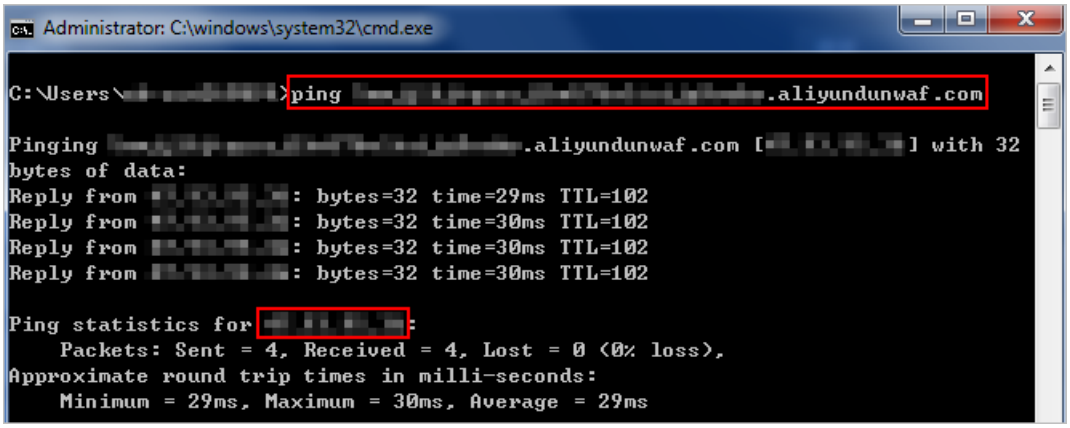
If your origin server IP address is exposed, attackers may bypass WAF and launch attacks on your origin server. To avoid attacks, we recommend that you configure

an ECS security group or SLB whitelist to block malicious requests. For more information, see *Protect your origin server*.

Use A records to deploy WAF

The procedures to specify A records and CNAME records are similar. However, they have the following two differences:

- Prerequisites: After you have obtained the WAF CNAME address, follow these steps to obtain the WAF IP address:
  1. In a Windows operating system, open Command Prompt.
  2. Run the following command: `ping “copied WAF CNAME address”`.



  3. Record the WAF IP address that is displayed in the command output.
- Procedure: Perform the following steps in step 4:
  - Type: Change the type to A.
  - Value: Enter the WAF IP address.
  - Keep the remaining settings unchanged.

3.3 Whitelist Alibaba Cloud WAF IP addresses

When a website is deployed with Alibaba Cloud WAF, all web traffic is redirected to WAF for inspection, and WAF returns the inspected traffic to origin server.

From the origin server’s perspective, all web requests arrive from a limited quantity of WAF IP addresses, which is suspicious. If the origin server has been installed with a security software such as FortiGate, the security software may trigger a blocking action against WAF IP address and web traffic returned by WAF. Therefore, you must whitelist all WAF IP addresses in the security software in origin server to avoid normal business interruption.

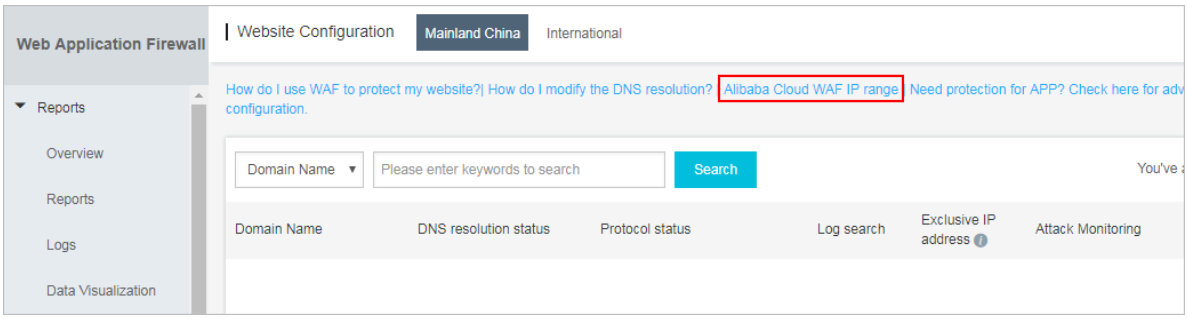
Note:

We recommend that you uninstall other security software in origin server after Alibaba Cloud WAF is deployed.

Procedure

You can view the IP addresses of Alibaba Cloud WAF in the Alibaba Cloud WAF console. The procedure is as follows.

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China, International.
3. Go to the Management > Website Configuration page.
4. Click Alibaba Cloud WAF IP range to view and copy all WAF IP addresses.



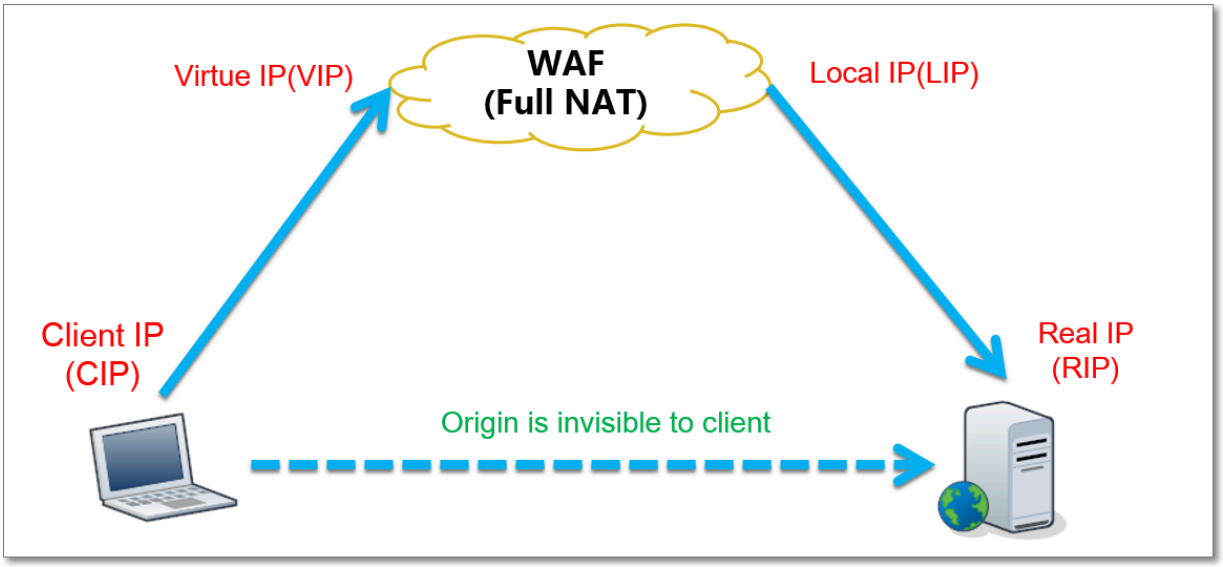
You can see the following result:

5. Open the security software in origin server, and add the copied WAF IP addresses to the IP whitelist.

FAQs

What is the Alibaba Cloud WAF IP address?

Alibaba Cloud WAF acts as a reverse proxy between your client and origin server. In origin server’ s eyes, all web requests originate from Alibaba Cloud WAF IP addresses and the real client IP addresses are written into the XFF (X-Forwarded-For) field of HTTP header.



Why must I whitelist Alibaba Cloud WAF IP addresses?

From origin server’ s perspective, web requests from the Alibaba Cloud WAF IP addresses are more concentrated and in a high frequency. The security software in origin server may determine that Alibaba Cloud WAF IP addresses are starting attacks , and trigger a blocking action against them. If Alibaba Cloud WAF IP addresses are blocked, the real client cannot get a response. Therefore, you must whitelist Alibaba Cloud WAF IP addresses once your website is deployed with WAF. Otherwise, normal web access may be affected, which leads to web pages cannot be opened or respond slowly.

We recommend that after deploying Alibaba Cloud WAF, you only allow web requests originate from WAF and block other requests to guarantee normal web business access and avoid direct-to-origin attacks. If the origin server IP address is disclosed, an attacker can bypass WAF to directly attack your origin server. For more information, see *Protect your origin server*.

3.4 Perform redirect check with a local computer

When you have created a website configuration in Alibaba Cloud WAF for your website and are going to update the DNS settings to redirect web traffic to WAF for inspection, we recommend that you perform a redirect check with a local computer to make sure that WAF can handle the traffic. Redirect check requires you to modify the local hosts file to make your local machine look directly at your Alibaba Cloud WAF instance. Therefore, you can test whether the WAF instance works properly.

Modify the local hosts file

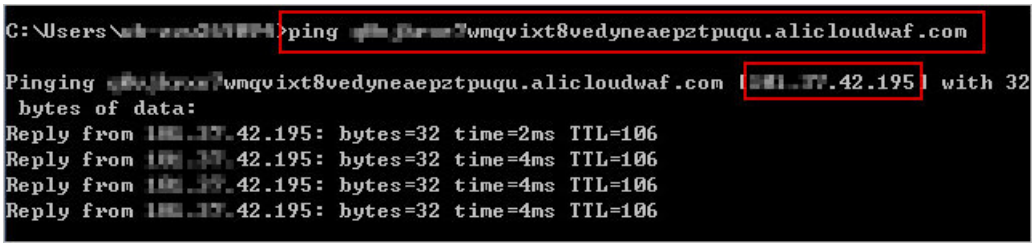
Modify the local `hosts` file (*What is the hosts file?*) to forward local requests to WAF. For Windows systems, the procedure is as follows:

1. Open the `hosts` file with Notepad. The `hosts` file locates in the `C:\Windows\System32\drivers\etc\hosts` directory.
2. In the last line, add the following content: `WAF_IP_address Domain_name_protected`.

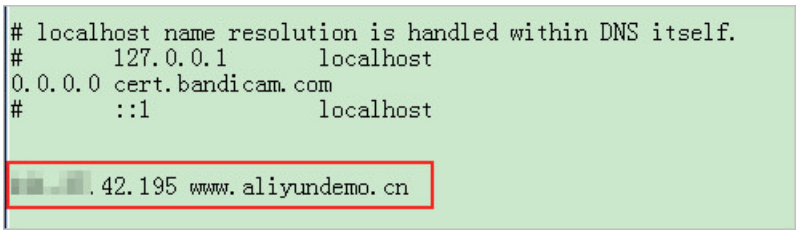
   Suppose that you have created a website configuration for `www.aliyundemo.cn`, and Alibaba Cloud WAF assigns the following CNAME address to it: `xxxxxxxxxw.mqvixt8ved.yneaepztpu.qu.alicloudwaf.com`.

   a. Open the cmd command-line tool in Windows, and run the following command to obtain the WAF IP address: `ping xxxxxxxxxw.mqvixt8ved`

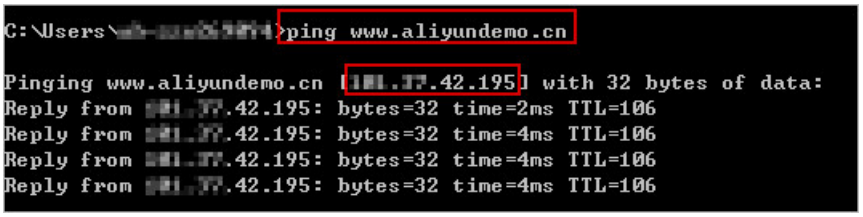
`yneaepztpu qu . alicloudwa f . com`. You can view the WAF IP address in the response.



b. Add the following line to *hosts*. The IP address is the WAF IP address obtained in the previous step, and the domain name is the protected domain name.



3. Save changes to *hosts*. Ping the protected domain name in cmd.



If WAF works properly, the IP address you see will be the WAF IP address configured in the previous step. If the origin IP address is displayed, try refreshing the local DNS cache. In Windows, you can run `ipconfig / flushdns` in cmd.

Verify WAF forwarding

Once the changes in the hosts file are effective, you can access the protected domain name from your local computer. If WAF is configured correctly, the website is expected to be normally accessed.

In addition, you can verify the protection effect by constructing some simple attack commands. For example, you can add `/? alert ( xss )` to the URL to construct a Web attack request for testing. As you try to access `www . aliyundemo . cn /? alert ( xss )`,

3.5 Update HTTPS certificates

To let Alibaba Cloud WAF inspect HTTPS traffic for your web business, you must include HTTPS in the protocol type in *website configuration*, and upload a valid HTTPS certificate to WAF. If the certificate changes, you must update the certificate in the Alibaba Cloud WAF console in a timely manner.

Context

If you have uploaded the certificate file to *Alibaba Cloud SSL Certificate Service* for integrated management, then in the following steps, you can reuse it directly instead of uploading it again.

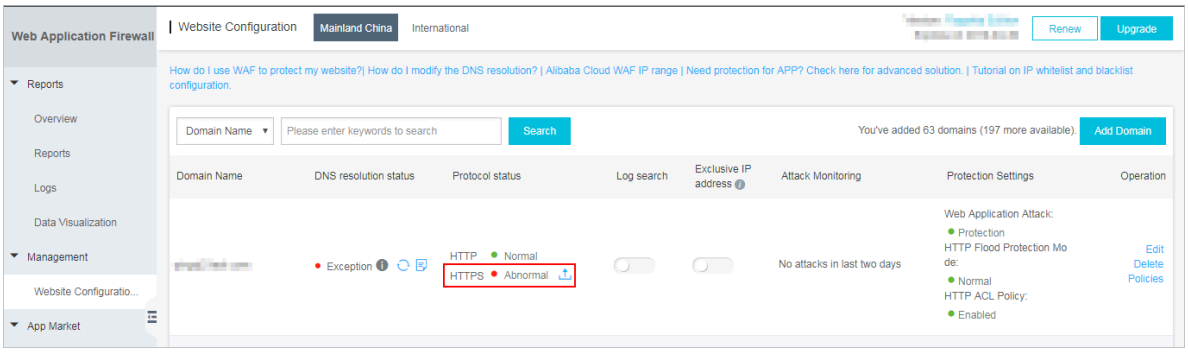
Otherwise, you must have the certificate and private key files prepared, to complete the following operations.

In general, the following files are required:

- *.crt (Public key) or *.pem (Certificate)
- *.key (Private key)

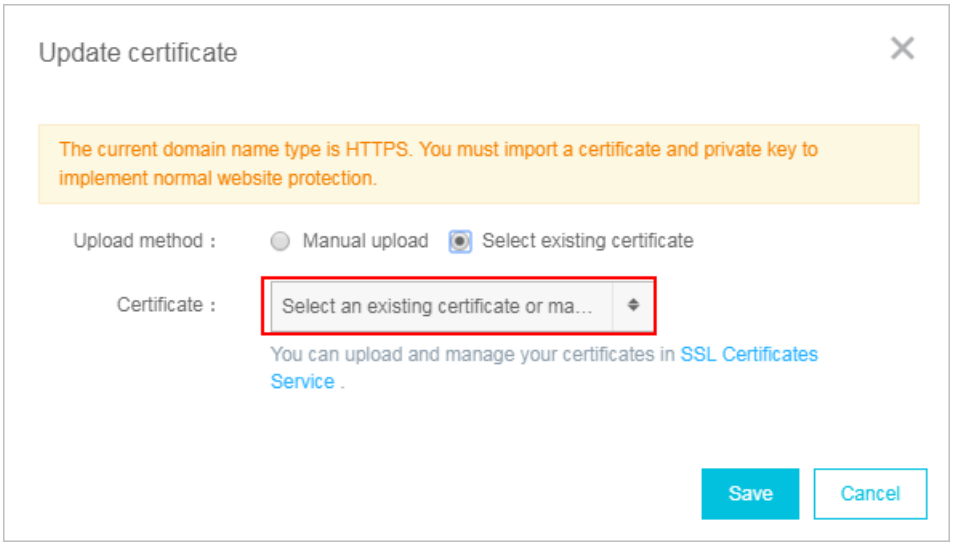
Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China, International.
3. On the Management > Website Configuration page, locate the domain name to be operated, and click the Update Certificate button (↑) next to the HTTPS Protocol Status.



4. In the Update Certificate dialog box, select an Upload method.

   - If the HTTPS certificate to be uploaded is hosted in *Alibaba Cloud SSL Certificate Service*, you can check Select existing certificate and select it for upload.



   - Manual upload. Click Manual upload, enter a Certificate name, and paste the text context of the certificate file and private key file respectively to the Certificate file and Private key file boxes.

> **Note:**
>
> - For certificates in general formats, such as PEM, CER, and CRT, you can open the certificate file directly by using a text editor tool to copy the text content . For certificates in other formats, such as PFX and P7B, convert the certificat e file to the PEM format, and then copy the text content from the converted certificate file.
> - If the HTTPS certificate has multiple certificate files, such as a certificate chain file, merge the text contents from the multiple certificate files and paste them into the Certificate file box.

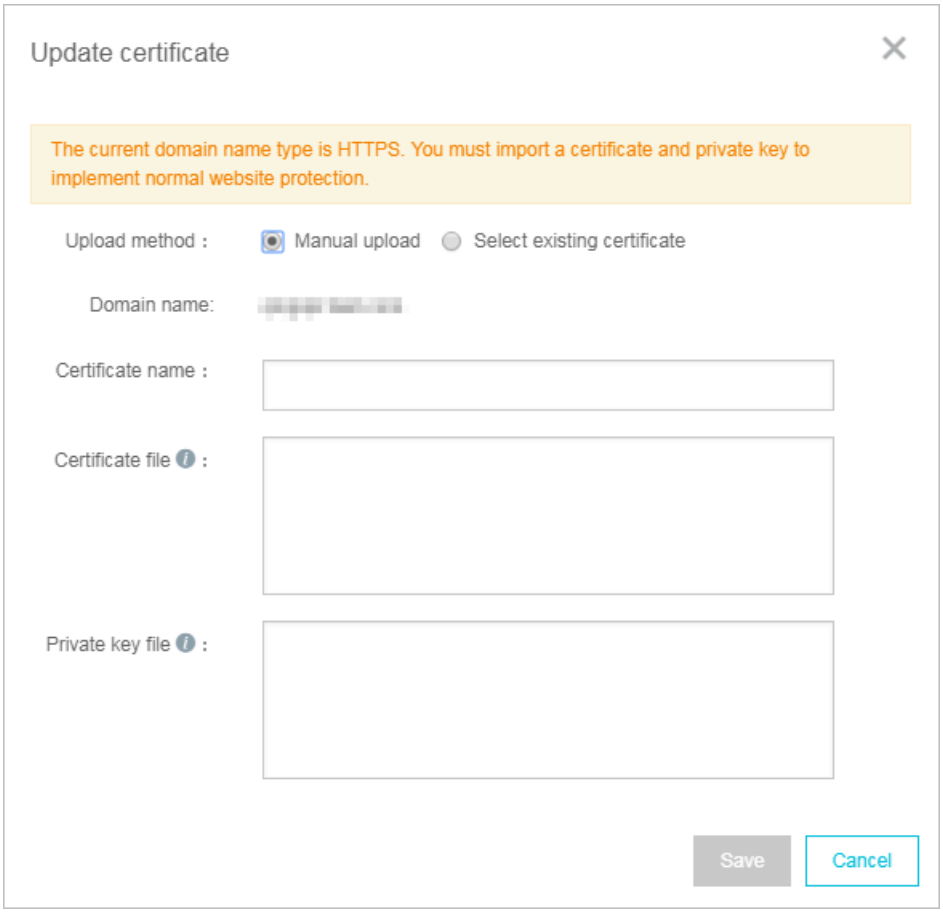
Example of the text content of a certificate file:

```
----- BEGIN   CERTIFICAT  E -----
 xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx  xxxxxxxxxx
 8ixZJ4krc + 1M + j2kcubVpsE  2
 cgHdj4v8H6  jUz9Ji4mr7  vMNS6dXv8P  Ukl / qoDeNGCNdy  TS5NIL5ir +
 g92cL8IGOk  jgvhlqt9vc
 65Cgb4mL + n5 + DV9uOyTZTW / MojmlgfUek  C2xiXa54nx  Jf17Y1TADG
 SbyJbsC0Q9  nIrHsPl8YK  k
 vRWvIAqYxX  Z7wRwWWmv4  TMxFhWRiNY  7yZIo2ZUhl  02SIDNggIE  eg ==
```

```
----- END   CERTIFICAT  E -----
```

Example of the text content of a private key file:

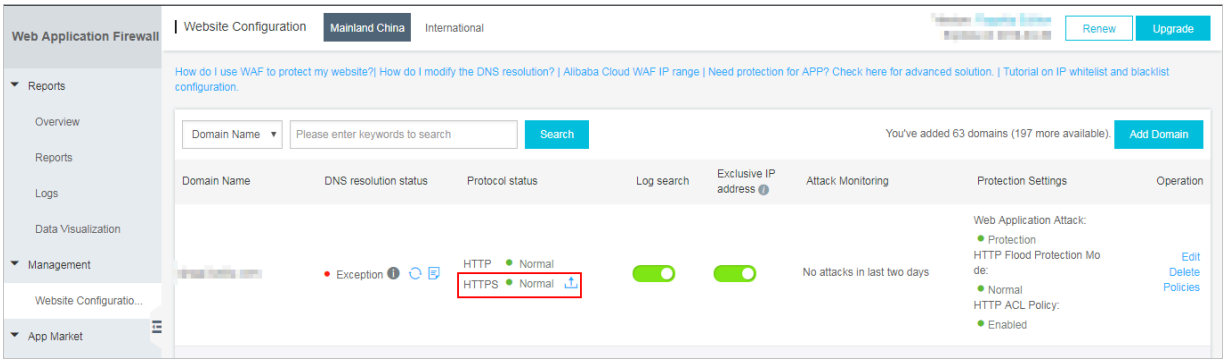
```
----- BEGIN   RSA   PRIVATE   KEY -----
 DADTPZoOHd  9WtZ3UKHJT  RgNQmioPQn  2bqdKHop + B / dn /
 4VZL7Jt8zS  DGM9sTMThL  yvsmLQKBgQ
 Cr + ujntC1kN6p  GBj2Fw2l / EA / W3rYEce2ty  hjgmG7rZ + A /
 jVE9fld5sQ  ra6ZdwBcQJ  aiygoIYo
 aMF2EjRwc0  qwHaluq0C1  5f6ujSoHh2  e + D5zdmkTg / 3NKNjqNv6x
 A2gYpinVDz  FdZ9Zujxvu  h9o
 4Vqf0YF8bv  5UK5G04RtK  adOw ==
----- END   RSA   PRIVATE   KEY -----
```



5. Click Save to complete the procedure.

Result

The HTTPS protocol status displays as Normal.

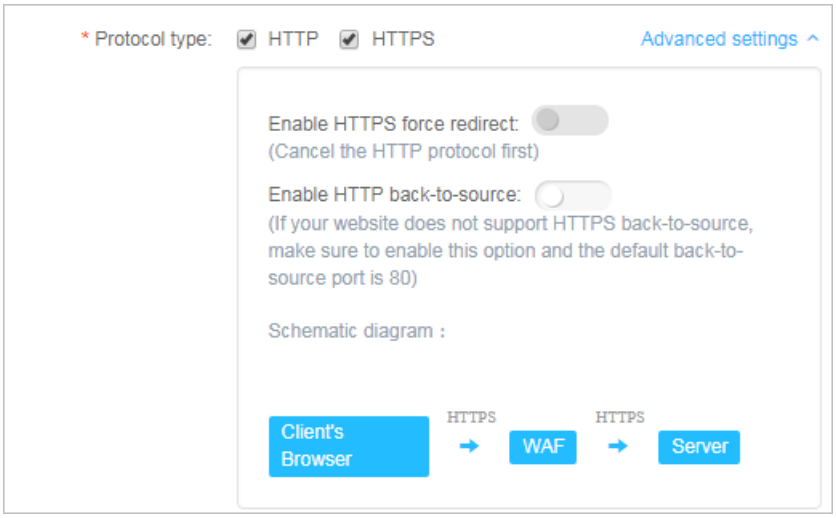


3.6 HTTPS advanced settings

Alibaba Cloud WAF provides convenient HTTPS options to help you implement HTTP back-to-source and HTTPS force redirect without re-constructing the origin.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China, International.
3. On the Management > Website Configuration page, locate the domain name to be operated, and click Edit.
4. Check HTTPS under Protocol type, and expand the Advanced settings menu.

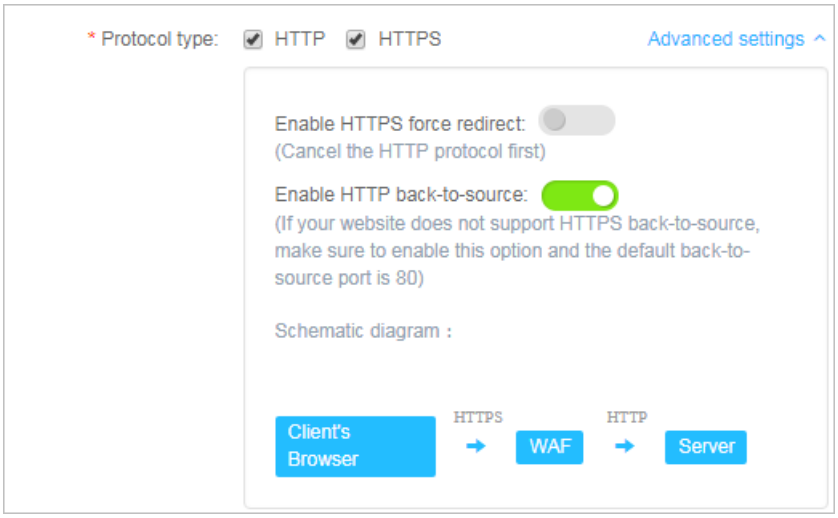


- Enable HTTP back-to-source

  You can enable an HTTP communication between Alibaba Cloud WAF and origin server by enabling HTTP back-to-source. By doing this, WAF returns the inspected traffic to the default port of 80 of your origin server.

  Note:

Using HTTP back-to-source does not require any modification on origin server or any HTTPS configuration. However, you must make sure that you upload the correct certificate and private key to Alibaba Cloud WAF. You can apply for a certificate for free in Alibaba Cloud SSL Certificate Service.



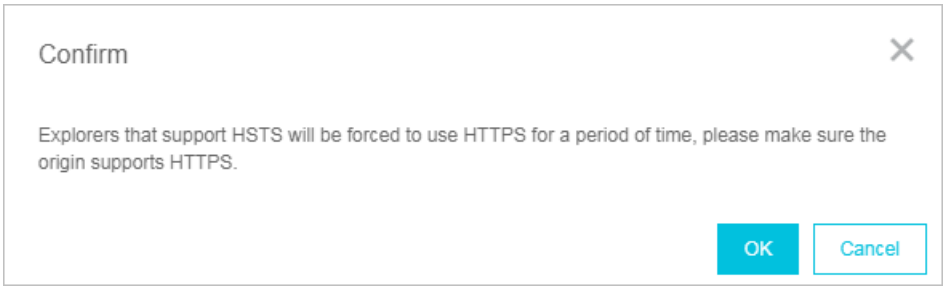
- Enable HTTPS force redirect

  If you want to force clients to use HTTPS to access your sites, you can enable HTTPS force redirect.

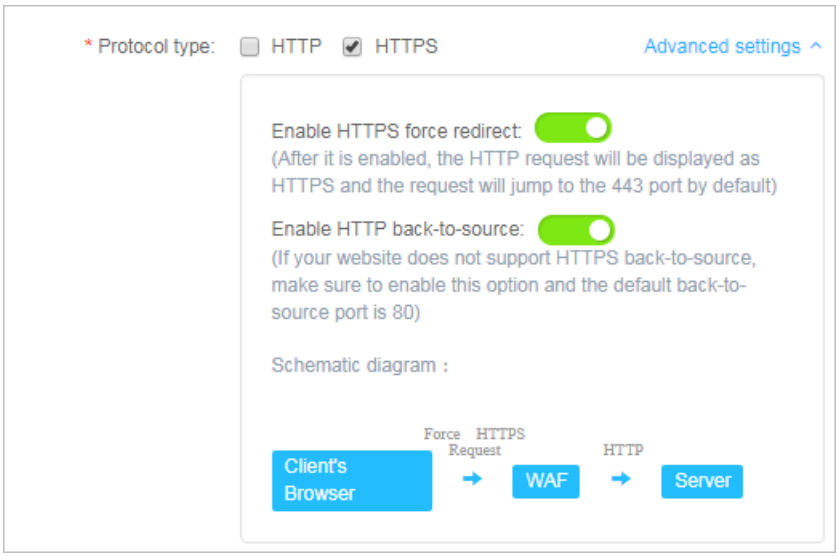
  Note:

You must cancel the HTTP protocol to enable HTTPS force redirect.

When HTTPS force redirect is enabled, some Web browsers that support HSTS (HTTP Strict Transport Security) will be forced to use HTTPS for a period of time. Therefore, you must make sure that the origin server supports HTTPS.



When HTTPS force redirect is enabled, all HTTP requests will be displayed as HTTPS and forwarded to port 443.



3.7 Supported non-standard ports

Alibaba Cloud WAF returns web traffic to the following ports of origin server by default: port 80 and 8080 for HTTP connection and port 443 and 8443 for HTTPS connection. You can specify other ports with the Business or Enterprise subscription plan. This topic explains the maximum number of ports you can specify and the custom ports you can use.

Maximum number of ports

For each Alibaba Cloud WAF subscription, the maximum number of different ports you can specify in all website configurations is as follows:

- Business plan: You can specify a maximum of 10 different ports, including port 80, 8080, 443, and 8443.
- Enterprise plan: You can specify a maximum of 50 different ports, including port 80, 8080, 443, and 8443.

Supported ports

Note:
Alibaba Cloud WAF only inspects web traffic that requests the supported ports. When a client requests an unsupported port (for example, 4444), the request will be discarded.

- For the Business or Enterprise subscription plan of Alibaba Cloud WAF, the following HTTP ports are supported:

  80, 81, 82, 83, 84, 88, 89, 800, 808, 1000, 1090, 3333, 3501, 3601, 5000, 5222, 6001, 6666, 7000, 7001, 7002, 7003, 7004, 7005, 7006, 7009, 7010, 7011, 7012, 7013, 7014, 7015, 7016, 7018, 7019, 7020, 7021, 7022, 7023, 7024, 7025, 7026, 7070, 7081, 7082, 7083, 7088, 7097, 7777, 7800, 8000, 8001, 8002, 8003, 8008, 8009, 8020, 8021, 8022, 8025, 8026, 8077, 8078, 8080, 8081, 8082, 8083, 8084, 8085, 8086, 8087, 8088, 8089, 8090, 8091, 8106, 8181, 8334, 8336, 8800, 8686, 8888, 8889, 8999, 9000, 9001, 9002, 9003, 9080, 9200, 9999, 10000, 10001, 10080, 12601, 86, 9021, 9023, 9027, 9037, 9081, 9082, 9201, 9205, 9207, 9208, 9209, 9210, 9211, 9212, 9213, 48800, 87, 97, 7510, 9180, 9898, 9908, 9916, 9918, 9919, 9928, 9929, 9939, 28080, 33702
- For the Business or Enterprise subscription plan of Alibaba Cloud WAF, the following HTTPS ports are supported:

  443, 4443, 5443, 6443, 7443, 8443, 9443, 8553, 8663, 9553, 9663, 18980

3.8 Mark WAF back-to-origin flow

When you add a website domain configuration in Web Application Firewall for protection, you can set the flow mark for the website domain. When the traffic of the website domain passes through WAF, WAF adds the specified flow mark to the requests. Thus, the origin server can easily collect corresponding information.

According to the HTTP header field name and the field value that you specify in the flow mark, when the traffic passes through WAF, WAF adds the fields and values to the HTTP Header of all requests. By marking the traffic, you can easily identify traffic that

are forwarded by WAF, and then configure precise origin server protection policies (Access Control), or analyze protection effects.

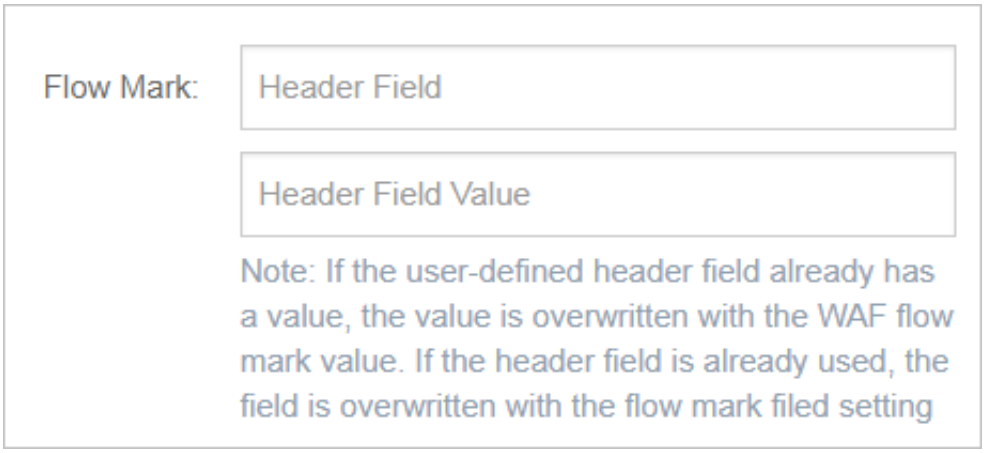
> Note:
> If the user-defined HTTP Header field that you specified as flow mark already exists in the request, WAF still overwrites the field value with the specified flow mark field value in the request.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China, International.
3. Go to the Management > Website Configuration page, choose a domain configuration record, and click Edit.

   > Note:
   > You can also specify flow mark when adding a new website domain configuration record.
4. In the Flow Mark configuration item, enter the Header field name and the field value.

   > Note:
   > Do not specify a user-defined HTTP Header field that has already been used. Otherwise, the value of this field in the request is overwritten by the flow mark field value by WAF.

5. Click OK. After the configuration takes effect, WAF adds the specified HTTP header fields and values when forwarding requests to the website domain.

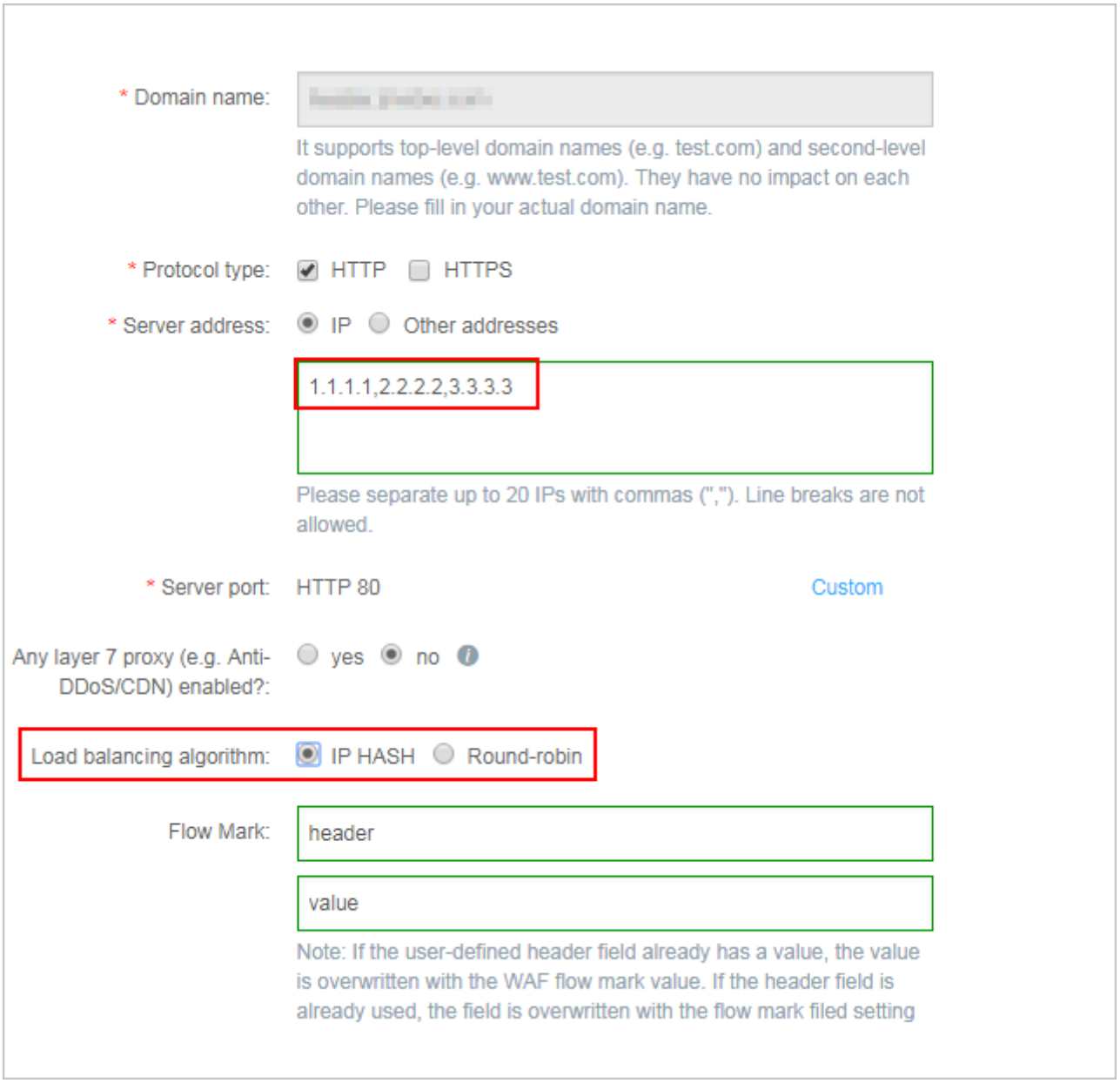
3.9 Load balance across multiple origin IPs

You can specify a maximum of 20 origin IP addresses in a website configuration.

When multiple origin IP addresses are specified, WAF performs load balance across them when returning the inspected web traffic. WAF also performs health check on all origin IPs. When one IP is inaccessible, WAF stops assigning requests to that IP until it can be accessed again.

Suppose you have three origin IPs: 1.1.1.1, 2.2.2.2, and 3.3.3.3. You can configure your website as follows.

Note:
If you have other layer-7 proxies enabled together with WAF, such as DDoS protection or CDN, make sure that you select yes for Any layer 7 proxy (e.g. Anti-DDoS/CDN) enabled? in website configuration



When multiple origin IPs are specified, select a load balancing algorithm, such as IP HASH or Round-robin.

Note:

If you use IP hash, make sure that the origin IP addresses are discrete. Otherwise, load balancing may not work properly.

3.10 Deploy WAF and Anti-DDoS Pro together

Alibaba Cloud WAF and Anti-DDoS Pro and are fully compatible. You can use the following architecture to deploy WAF and Anti-DDoS Pro together: Anti-DDoS

Pro (entry layer, DDoS attack protection) > WAF (intermediate layer, web attack protection) > Origin.

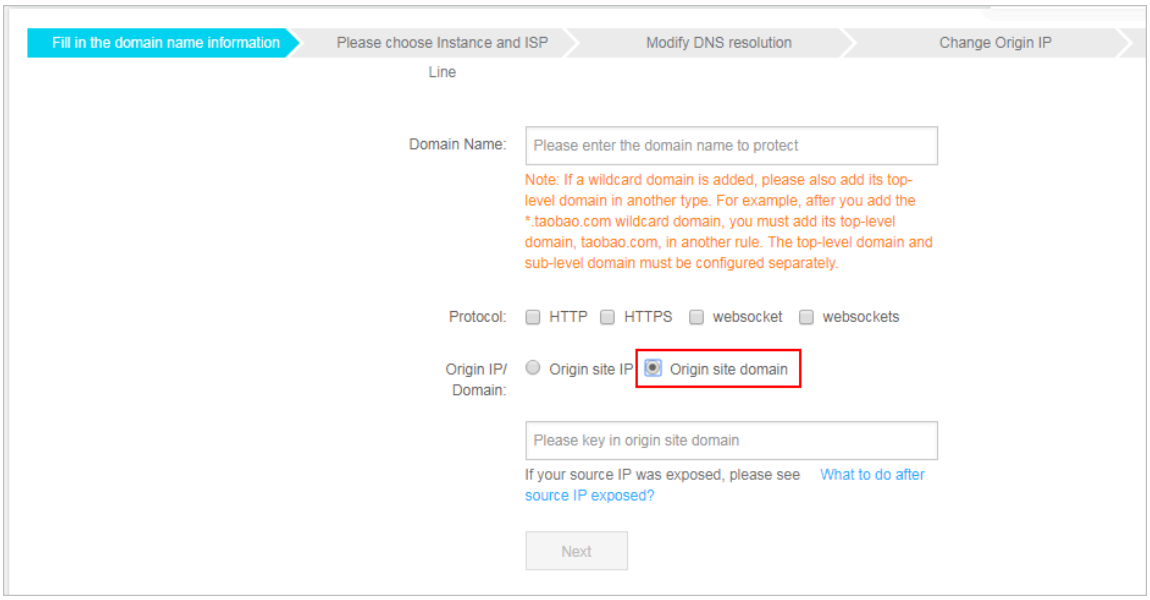
Procedure

1. Create a website configuration for your website in Alibaba Cloud WAF.
   - Server address: Check IP and enter the public IP address of the ECS instance/ Server Load Balancer instance or external server IP address.
   - Any layer 7 proxy (e.g. Anti-DDoS/CDN) enabled?: Check yes.

   For more information, see *Website configuration*.
2. Create a web service access configuration for your website in Anti-DDoS Pro. The procedure is as follows:
   a. On the Access > Web Service page, click Add Domain.
   b. In the Fill in the domain name information task, do the following:
      - Domain name: Enter the domain name to be protected.
      - Protocol: Check the supported protocol.
      - Origin IP/Domain: Check Origin site domain and enter the WAF CNAME address.

        Note:

> For more information about how to view the WAF CNAME address, see *WAF deployment guide*.



c. Click Next.

d. Complete the Please choose Instance and ISP Line task.

3. Update the DNS settings of your domain name. Log on to the DNS host's system and add a CNAME record to redirect web traffic to the Anti-DDoS Pro CNAME address.

   For more information, see *Access Anti-DDoS Pro through a CNAME record*.

Result

All web requests to your website are redirected to Anti-DDoS Pro for cleanup and then redirected to WAF for inspection before they reach your origin server.

3.11 Deploy WAF and CDN together

You can deploy Alibaba Cloud WAF and CDN (Content Delivery Network) together to speed up your website and protect against web attacks at the same time. We recommend that you use the following architecture: CDN (entry layer, website speed up) > WAF (intermediate layer, web attacks protection) > Origin.

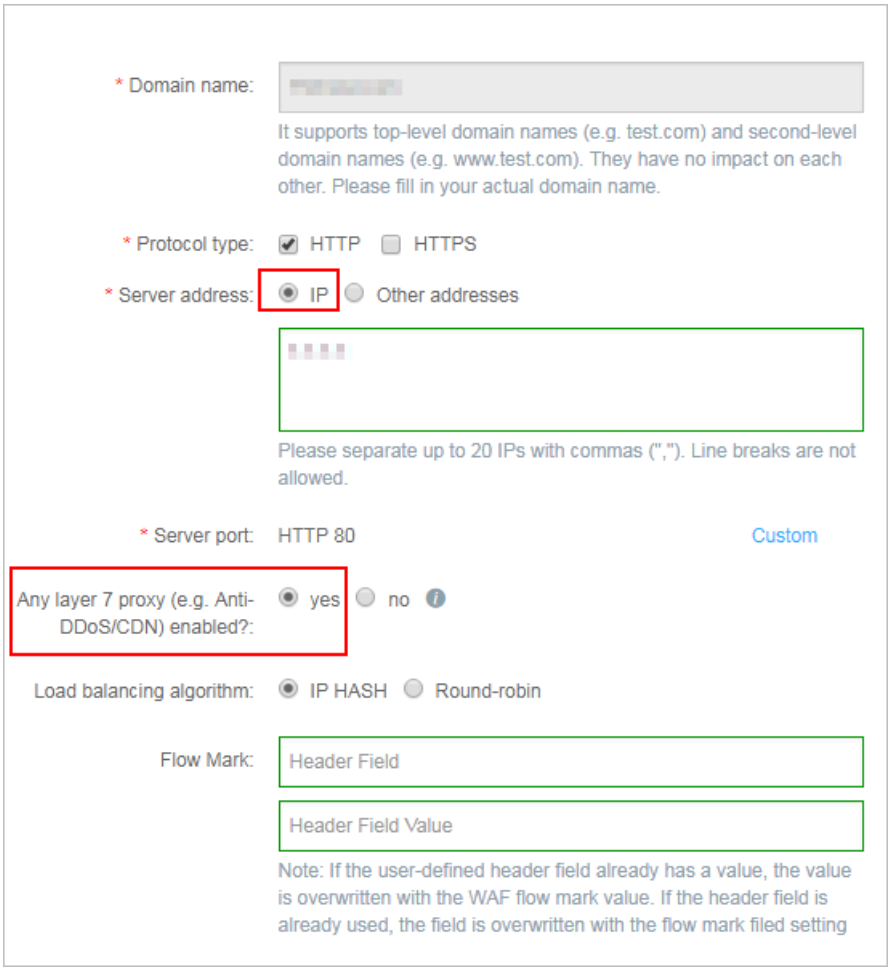
Procedure

Suppose you use Alibaba Cloud CDN. Follow these steps to deploy WAF and CDN together:

1. See *Get started with Alibaba Cloud CDN* to implement a CDN for your domain name.

2. Create a website configuration in Alibaba Cloud WAF.
   - Domain name: Enter the CDN-enabled domain name. Wildcard is supported.
   - Server address: Enter the public IP address of the ECS/Server Load Balancer instance, or the external server IP address of the origin server.
   - Any layer 7 proxy (e.g. Anti-DDoS/CDN) enabled?: Check yes.

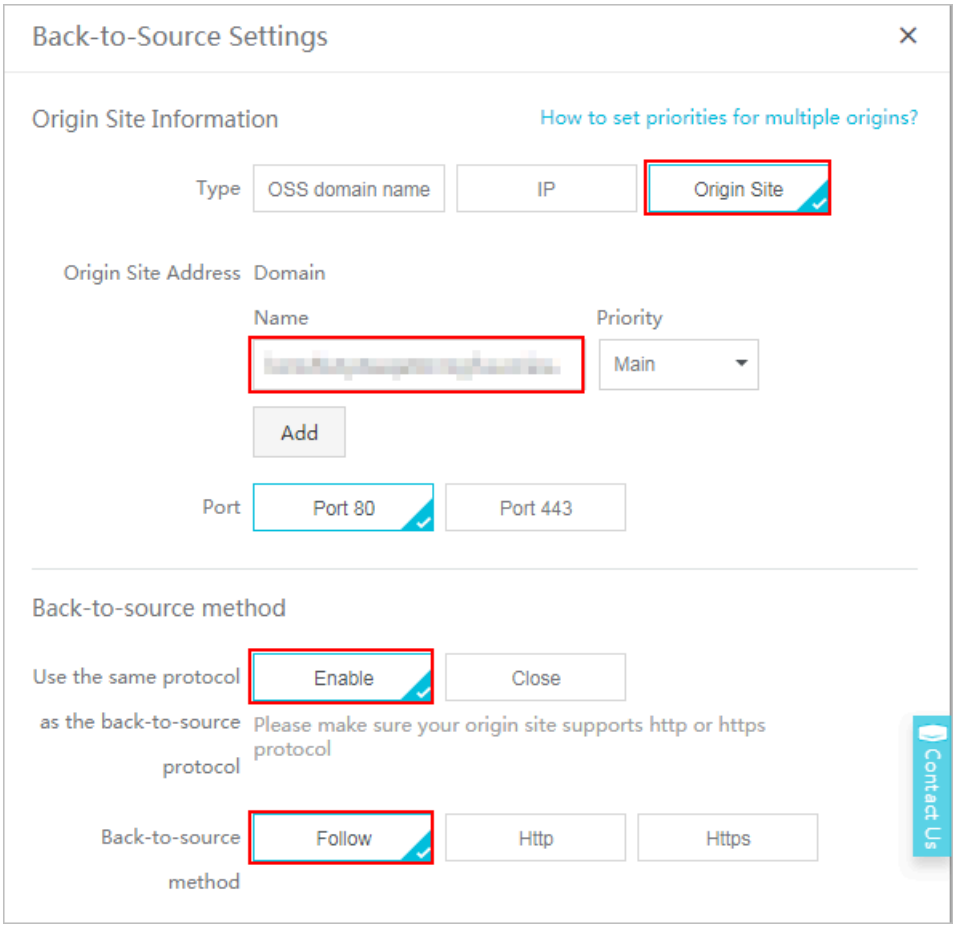
   For more information, see *Website configuration*.



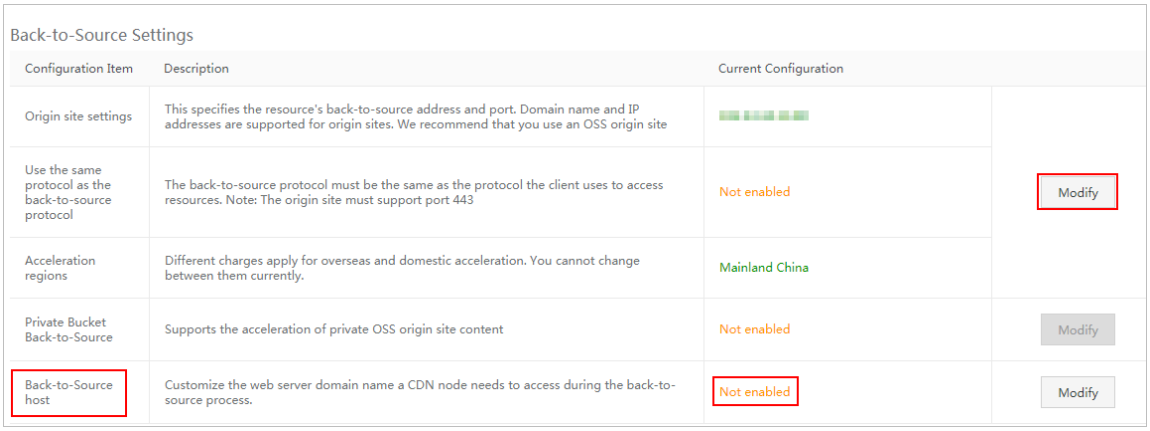
3. When the website configuration is successfully created, WAF generates a dedicated CNAME address for it.

> **Note:**
> For more information about how to view the WAF CNAME address, see *WAF deployment guide*.

4. Modify the CDN configuration to change the origin site address to the WAF CNAME address.
   a. Log on to the *Alibaba Cloud CDN console*.
   b. Go to the Domain Names page, select the domain to be configured, and click Configure.
   c. Under Origin site settings, click Modify.
   d. Modify origin site information.
      - Type: Select Origin Site.
      - Origin site address IP: Enter the WAF CNAME address.
      - Use the same protocol as the back-to-source protocol: Select Enable.



   e. Under Back-to-Source Settings, make sure that Back-to-Source host is disabled.



After the operation is complete, the traffic goes through CDN, and the dynamic content continues to be checked and protected by WAF.

4 Configuration

4.1 Web application protection

Alibaba Cloud WAF protects your web resources against common Web application attacks, such as SQL injection and XSS cross-site attack. You can select a suitable inspection intensity, which includes loose, normal, and strict, to meet your actual needs.

Context

Once you have added your domain to the WAF protection list, you can enable Web application protection for it, and select a suitable protection policy at any time based on your actual needs. If you don't want to use the Web application protection function , you can disable it.

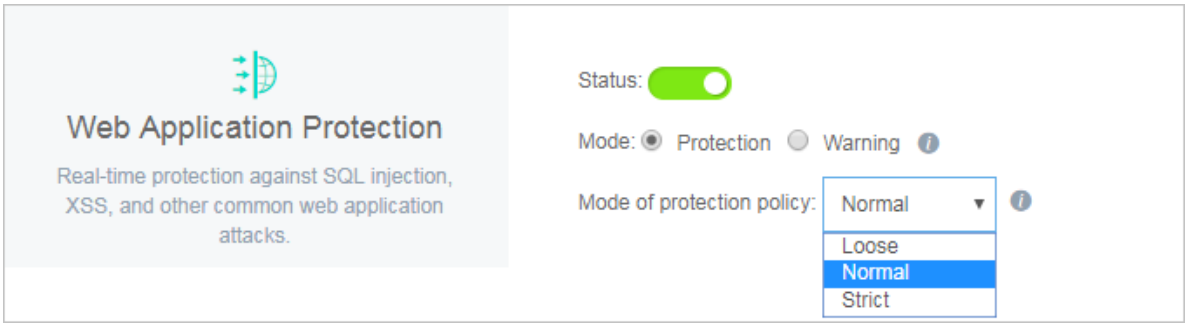
Make sure that you have added your domain to the WAF protection list before proceeding with the following operations. For more information, see *WAF deployment guide*.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.
4. Enable Web Application Protection, and select the Mode.

Note:

If you don't want to use this function, you can disable it on this page.



- Protection: Blocks the request when an attack is detected.
- Warning: Alerts you when an attack is detected. You determine whether to block the request or not.

5. In the Mode of protection policy drop down box, select a protection policy:
   - By default, the Normal mode is selected.
   - Enable the Loose mode when you find many false positives or uncontrollable user inputs (for example, rich text editor and technology forum) with the Normal mode.
   - Enable the Strict mode when you require stricter protection against path traversal, SQL injection, and command running attacks.

4.2 New intelligent protection engine

New intelligent protection engine performs semantic analysis on requests. Using semantic detection, the engine can discover disguised or hidden malicious content in web requests and effectively intercept malicious attacks that use obfuscation, variants, and other alike methods.

Function description

New intelligent protection engine performs semantic analysis on requests and matches the semantic analysis results against its exception and attack set to discover disguised and hidden web attack behaviors.

Note:
New intelligent protection engine mainly protects against SQL injection and other web attack methods, rather than HTTP flood attacks. If you have high web attack

protection requirements, we recommend that you enable new intelligent protection engine.

New intelligent protection engine has the following features:

- Semantics: New intelligent protection engine merges the similar behavior characteristics of similar attacks and aggregates the attack behaviors and characteristics of a single attack class into an attack feature. By grouping the multiple behavioral characteristics of attacks into specific permutations and combinations to represent individual attack classes, this function creates a semantic structure for attack behavior.
- Exception and attack set: Leveraging Alibaba Cloud Security's massive volume of operations data, this function models normal web applications, so that abnormalities can be detected. It extracts exception and attack models from a large volume of web application attacks to form an exception and attack set.

Procedure

Follow these steps to enable new intelligent protection engine:

Note:
Make sure that you have added your domain to the WAF protection list before proceeding with the following operations. For more information, see *WAF deployment guide*.

1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.
4. Enable New Intelligent Protection Engine.

Note:
If you do not want to use this function, you can disable it on this page.

4.3 HTTP flood protection

HTTP Flood protection helps you block HTTP flood attacks against your website.

Function description

HTTP Flood protection helps you block HTTP flood attacks in different modes, including Normal and Emergency. After adding your website to the WAF protection list, you can enable HTTP Flood protection and select an appropriate protection mode for the website. Upon identifying an HTTP flood attack, WAF disconnects from the client to protect your origin.

The Business and Enterprise editions support advanced HTTP flood protection. For more information, see *FAQ*.

Note:

The Emergency mode is applicable to web pages, but not to API/Native Apps, because it may result in a large number of false positives. For API/Native Apps, you can use *Custom HTTP Flood Protection*.

Procedure

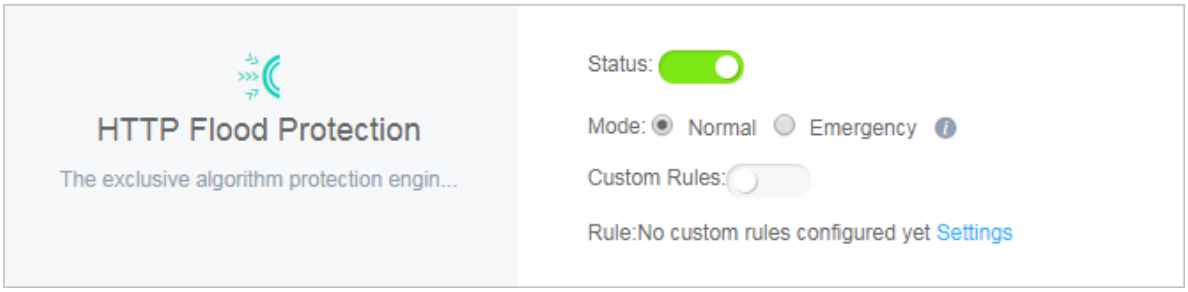
Follow these steps to configure HTTP flood protection mode:

Note:

Make sure that you have added your domain to the WAF protection list before proceeding with the following operations. For more information, see *WAF deployment guide*.

1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured and click Policies.

4. Enable HTTP Flood Protection and select the protection mode:



- Normal: Used by default. In Normal mode, WAF only blocks extremely suspicious requests, and the amount of false positives is relatively small. We recommend that you use this mode when there is no apparent traffic exception to your website to avoid false positives.
- Emergency: When you find many HTTP flood attacks are not blocked in the Normal mode, you can switch to the Emergency mode. In Emergency mode, WAF imposes strict inspection rules against HTTP flood attacks, but it may cause false positives.

Note:

- If many attacks are still missed out in the Emergency mode, check if the source IP addresses are WAF's back-to-Source IP addresses. If the origin is directly attacked, see *Protec your origin server* to only allow WAF's back-to-Source IP addresses to access the server.
- For better protection effects and lower false positive rate, you can use the Business Edition or Enterprise Edition to customize or request security experts to customize targeted protection algorithms for your website.

FAQ

What is the difference between HTTP flood protection capability for different WAF editions?

WAF is categorized based on the capacity to provide protection against the complex HTTP flood attacks.

- Pro Edition: supports default protection modes (Normal and Emergency), and blocks HTTP flood attacks with obvious attack characteristics.

- Business Edition: supports custom access control rules, and defends against HTTP flood attacks with certain attack characteristics. For more information, see *Custom HTTP flood protection*.
- Enterprise Edition: offers protection rules customized by security experts to guarantee solid protection effects.

For more information on how to upgrade WAF, see *Renewal and upgrade*.

Why must I upgrade WAF to the Business Edition to defend against certain HTTP flood attacks?

Alibaba Cloud WAF identifies attacks by using human identification, big data analysis , model analysis, and other techniques, and blocks attacks accordingly. Different from program interaction, security attack and defense is the confrontation between people. Each website has its own performance bottleneck. If hackers find a type of attack to be ineffective, they may analyze the website and then start a targeted attack . In this case, Alibaba Cloud Security experts can analyze the attack to provide a higher level protection and a better protect effect.

4.4 Custom HTTP flood protection

The Business and Enterprise editions of Alibaba Cloud WAF support customizing HTTP flood protection rules to apply rate-based access control.

Context

The frequency of certain URLs can be restricted from accessing your server by applying custom protection rules in the console. For example, you can define the following rule: when a single source IP address accesses `www . yourdomain . com / login . html` for more than 20 times within 10 seconds, then block this IP address for one hour.

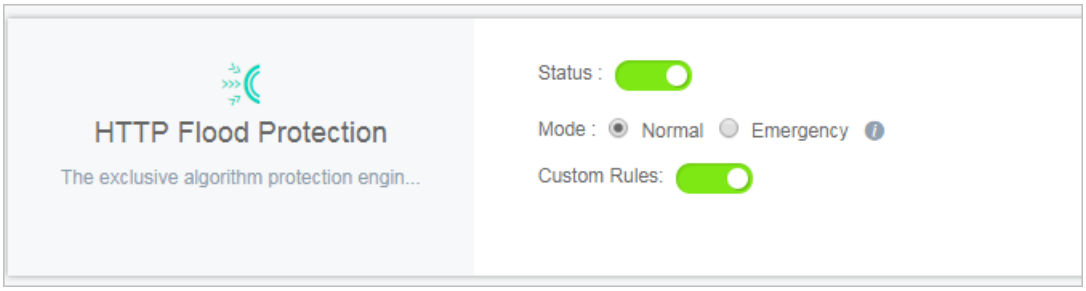
You must upgrade WAF to the Business or Enterprise edition to use this function. For more information, see *Renewal and upgrade*.

Make sure that you have added your domain to the WAF protection list before proceeding with the following operations. For more information, see *WAF deployment guide*.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.

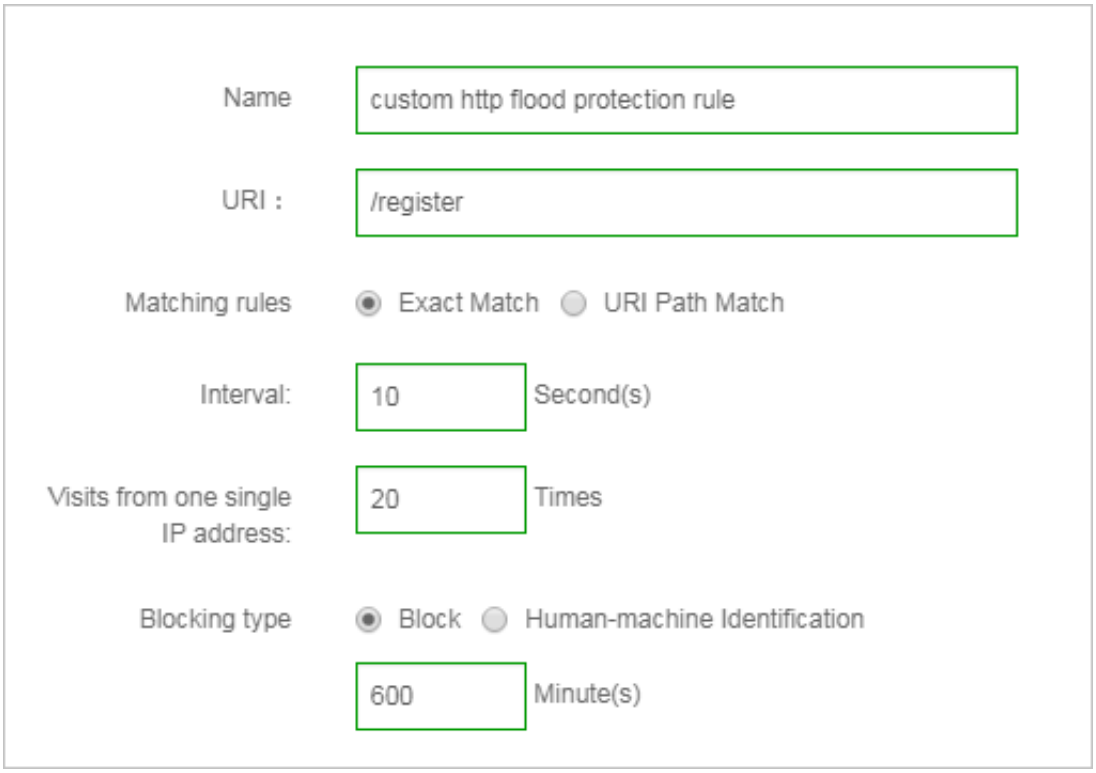
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.
4. Enable HTTP Flood Protection (Normal mode) and Custom Rules, and click Settings.



5. Click New Rule to add a rule. The parameters include:

Configuration	Description
Name	The name of this rule.
URI	The URI path to be protected. For example, `/register`. The path can contain parameters connected by "?". For example, you can use `/user?action=login`.
Matching rule	· Exact Match: The request URI must be exactly the same as the configured URI here to get counted. · URI Path Match: When the request URI starts with the URI value configured here, the request is counted. For example, `/register.html` is counted if you use `/register` as the URI.
Interval	The cycle for calculating the number of visits. It works in sync with Visits from one single IP address.
Visits from a single IP address	The number of visits allowed from a single source IP address to the URL during the Interval.

Configuration	Description
Blocking type	The action to be performed after the condition is met. The operations can be Block or Human-Machine Identification. · Block: blocks accesses from the client after the condition is met. · Man-Machine Identification: accesses the client with redirection after the condition is met. Only the verified requests are forwarded to the origin.



Consider the configurations in the preceding figure: a single IP address can access the target address (Exact Match) more than 20 times in 10 seconds, after which the IP is blocked for 600 minutes.

Since WAF collects data from multiple servers in the cluster to calculate the frequency of access from a single IP, a certain delay may exist in the statistical process.

Result

Once the rule is added successfully, you can Edit or Delete the rule.

4.5 HTTP ACL policy

With HTTP ACL policy, you can customize access control rules to filter HTTP requests by client IP, request URL, and commonly used HTTP fields.

Function description

HTTP ACL Policy supports customizing HTTP access control to filter HTTP requests based on a combination of criteria of commonly used HTTP fields, such as IP, URL, Referer, UA, and parameters. This feature applies to different business scenarios, such as anti-leech protection and website admin console protection.

HTTP ACL policy rule

Each HTTP ACL policy rule consists of a Matching condition and Action. When creating a rule, you define the matching condition by configuring matching fields, logical operators, and the corresponding match content, and select the action to be triggered in a match case.

Matching condition

A match condition is composed of matching fields, logical operators, and matching content. The matching content does not support regular expression descriptions, but is allowed to be set to null.

The following table lists all matching fields supported by HTTP ACL policy rules.

> **Note:**
> For WAF Pro instances, only IP, URL, Referer, User-Agent are supported in matching fields, and a maximum of 20 rules are allowed for each domain name. For WAF Business or Enterprise instances, all the listed matching fields are supported, and you can define up to 100 or 200 rules for each domain name respectively.

Matching field	Description	Supported logical operators
IP	The client IP address.	· Has · Does not have
URL	The requested URL.	· Includes · Does not include · Equals to · Does not equal to

Referer	The address of the previous web page with a link to the current request page.	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than · Does not exist
User-Agent	The user agent string that identifies information about the client's browser.	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than
Params	The parameters in the request URL, which start after "?". For example, the parameter of the URL `www . abc . com / index . html ? action = login` is `action = login` .	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than
Cookie	The cookie in the request URL.	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than · Does not exist

Content-Type	The Media type of the body of the request (used with POST and PUT requests).	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than
X-Forwarded-For	The x-forward-for field in the request URL. X-Forwarded-For (XFF) identifies the originating IP address of a client connecting to a web server through an HTTP proxy or load balancer.	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than · Does not exist
Content-Length	The length of the request body in octets (8-bit bytes).	· Value less than · Value equals · Value more than
Post-Body	The response content of the request.	· Includes · Does not include · Equals to · Does not equal to
Http-Method	The request method, such as GET, POST.	· Equals to · Does not equal to
Header	The customized header field.	· Includes · Does not include · Equals to · Does not equal to · Length less than · Length equals · Length more than · Does not exist

Note:
Each rule allows a combination of three conditions at most. Multiple conditions in a rule are connected by “AND”, that is, a request must satisfy all the conditions to match the rule.

Action

The following actions can be performed after a rule is matched:

- Block: blocks the request that matches the condition.
- Allow: allows the request that matches the condition.
- Warn: allows the request that matches the condition and triggers an alarm.

Note:
After specifying Allow or Warn, you can further decide whether to proceed to perform Web application protection, HTTP flood protection, new intelligent protection, regional blocking, and data risk control.

Sort rules

Matching rules follow a specific order. The rule with the higher ranking is matched first.

You can adjust the order of the rules to achieve the optimal protection performance.

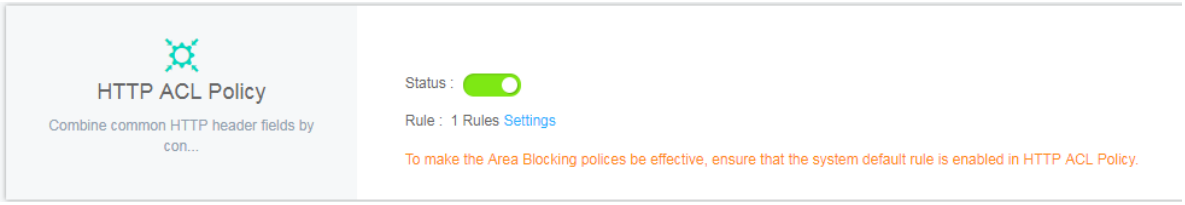
Procedure

Follow these steps to add a HTTP ACL policy rule for the protected domain name:

Note:
Before you perform the following operations, make sure that you have added the domain to WAF for protection. For more information, see *WAF deployment guide*.

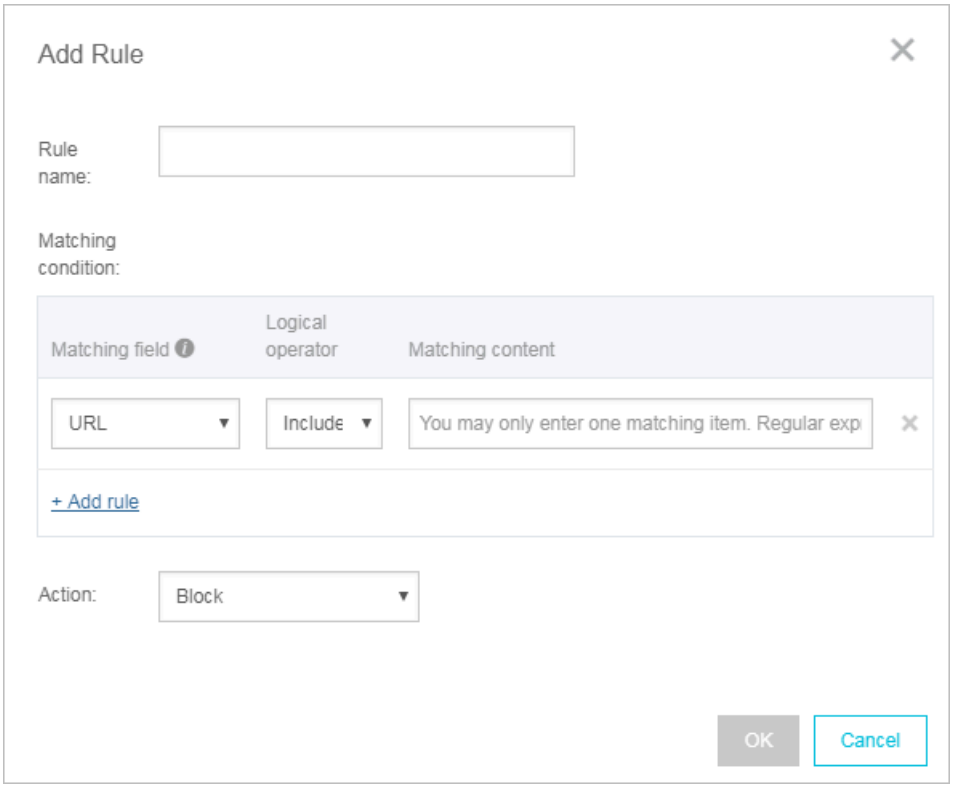
1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.

4. Enable HTTP ACL Policy, and click Settings.



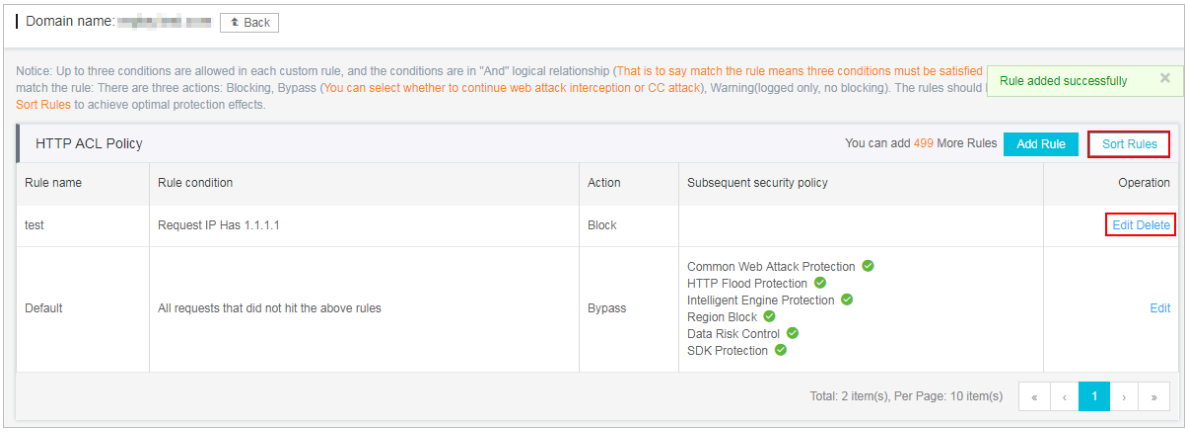
5. Click Add Rule, configure the expected rule, and click OK.

> **Note:**
> For more information about the configuration, see *HTTP ACL policy rule*. For more information about configuration examples, see *Configuration examples*.



6. For a created rule, you can either Edit its content or Delete it. If multiple rules are created, you can click Sort Rules to change the default order of them. By using

Move up, Move down, Move to top, and Move to bottom, you decide which rule is matched first.



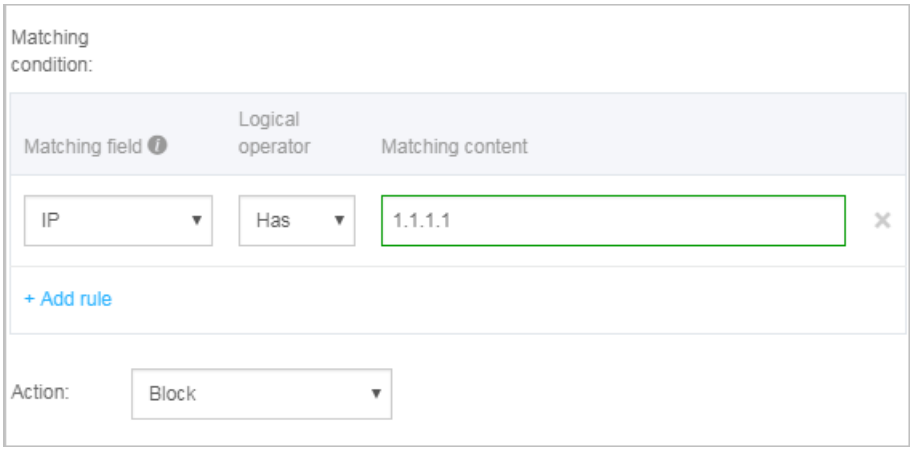
Configuration examples

HTTP ACL Policy supports various configuration methods. You can work out the best rules based on your business characteristics. You can also use HTTP ACL policy to fix certain Web vulnerabilities.

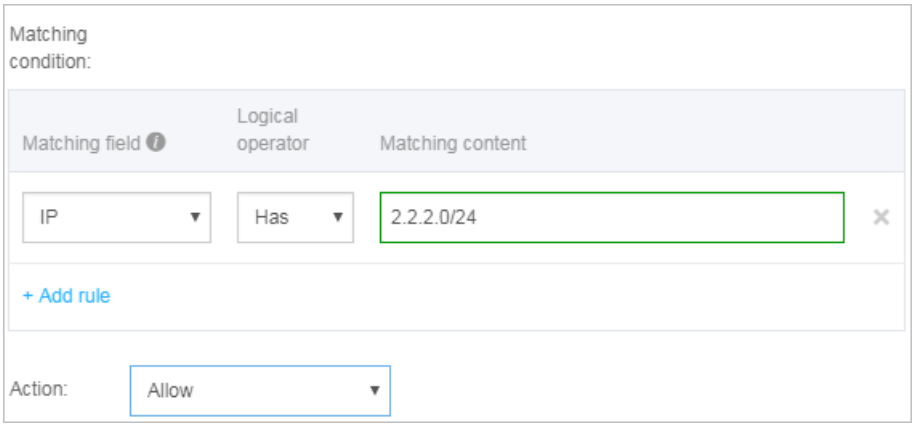
Some examples are as follows.

Configure IP blacklist and whitelist

Use the following configuration to block all access from 1.1.1.1.



Use the following configuration to allow all access from 2.2.2.0/24.



Note:

Do not check Proceed to execute web application attack protection or Proceed to execute HTTP flood attack protection.

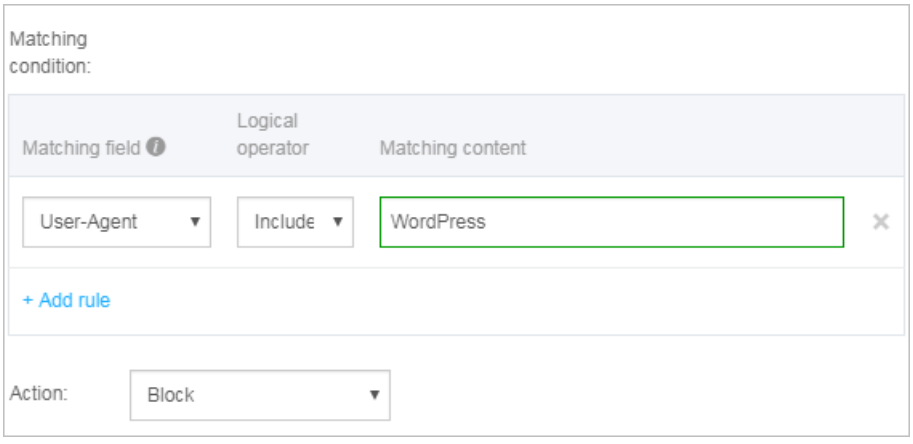
For more information, see *Set up IP whitelist and blcaklist*.

Block malicious requests

The following figure shows an example of WordPress bounce attack, featuring that the UA contains WordPress.

UA
WordPress/4.2.10; http://ascsolutions.vn; verifying pingback from 191.96.249.54
WordPress/4.0.1; http://146.148.63.90; verifying pingback from 191.96.249.54
WordPress/4.6.1; https://www.nokhostinsabt.com; verifying pingback from 191.96.249.54
WordPress/4.5.3; http://eadastage.lib.umd.edu; verifying pingback from 191.96.249.54
WordPress/3.5.1; http://danieljromo.com
WordPress/4.2.4; http://wd.icopy.net.tw; verifying pingback from 191.96.249.54
WordPress/4.6.1; http://kmgproje.com; verifying pingback from 191.96.249.54
WordPress/4.1.6; http://www.vv-atalanta.nl; verifying pingback from 191.96.249.54
WordPress/4.5; http://23.83.236.52; verifying pingback from 191.96.249.54
WordPress/4.6.1; http://playadelrey.news; verifying pingback from 191.96.249.54
WordPress/4.1; http://hostclick.us; verifying pingback from 191.96.249.54
WordPress/4.5.3; http://mosaics.pro; verifying pingback from 191.96.249.54
WordPress/4.0; http://www.chinavrheadset.com; verifying pingback from 191.96.249.54

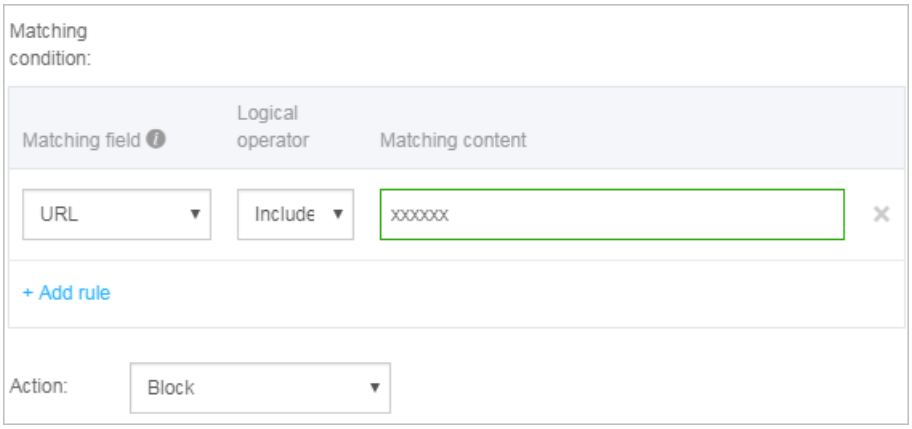
Use the following configuration to defend against this type of attack.



For more information, see *Prevent Wordpress pingback attacks*.

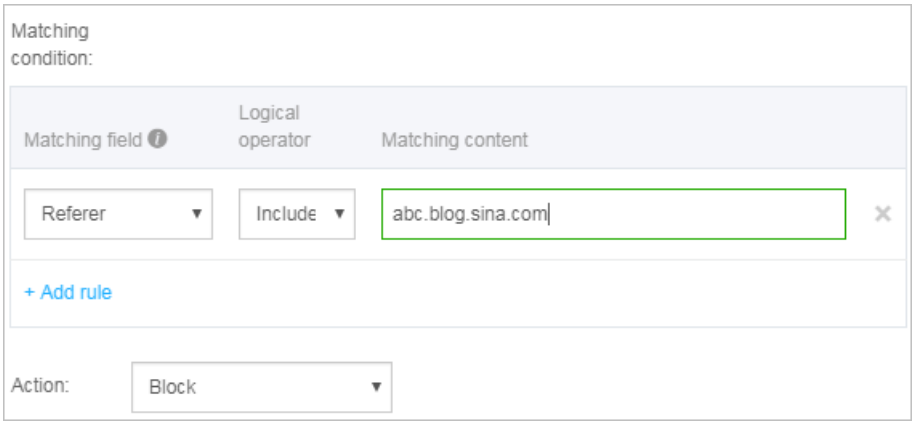
Block specific URLs

If a large number of IP addresses are requiring a specific but nonexistent URL, you can use the following configuration.



Anti-Leech

You can configure a Referer-based access condition. For example, if you find `abc . blog . sina . com` is using a large quantity of pictures on your site, you can use the following configuration.



4.6 Blocked regions

Use this feature to add specific areas of Mainland China, Hong Kong, Macao and Taiwan, and up to 247 countries in the world to the region blacklist. All requests from the specified areas are blocked.

Context

To enable the Blocked Regions feature, you must upgrade WAF to Enterprise Edition or above. For more information about the upgrade, see *Renewal and upgrade*.

To enable and specify blocked regions, follow these steps:

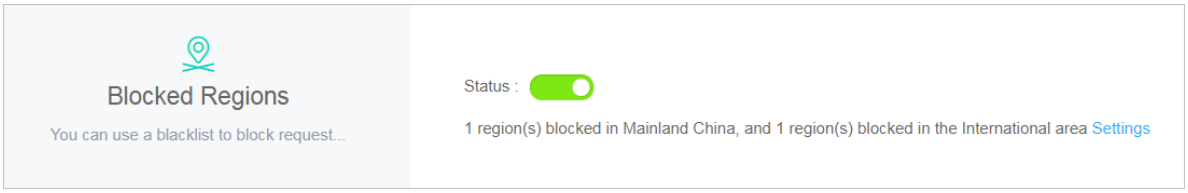
Note:

Ensure that you have added the target domain in WAF for protection. For more information, see *CNAME access guide*.

Procedure

1. Log on to the *Web Application Firewall console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.
4. Enable the Blocked Regions option.

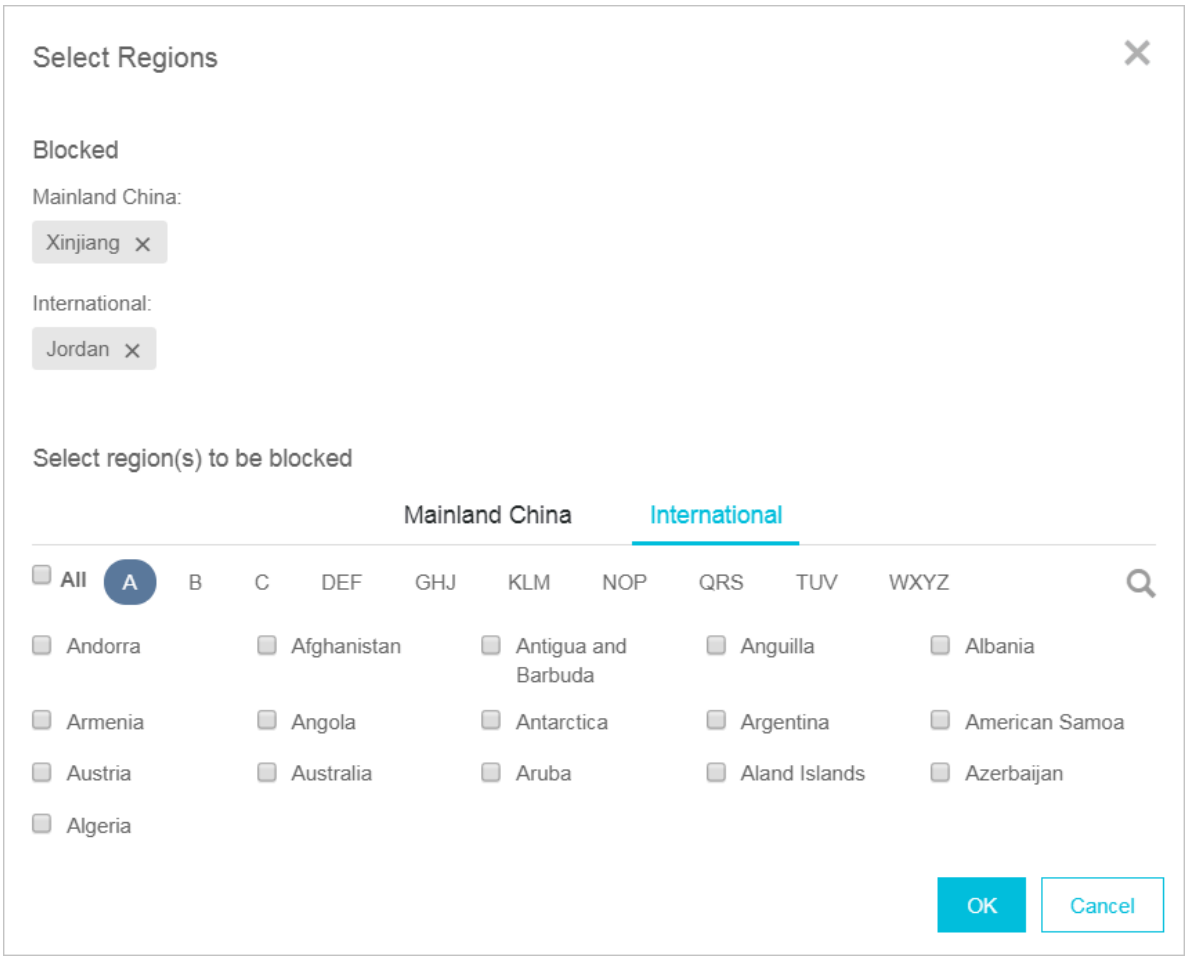
   Note:
   To make the Area Blocking polices be effective, ensure that the system default rule is enabled in HTTP ACL Policy.

5. Click Settings, select the Mainland China or International scope, and select the areas that you want to block. Then, click OK.

   Note:

When you select the International scope, you can quickly find the country or area through the initial letter of the country name or the quick search.



Result

After you confirm the settings, all requests from the IP addresses in the blocked areas are blocked by WAF.

Note:
The source area information of the IP is based on the *Alibaba Taobao IP address Library*.

4.7 Configure a whitelist or blacklist

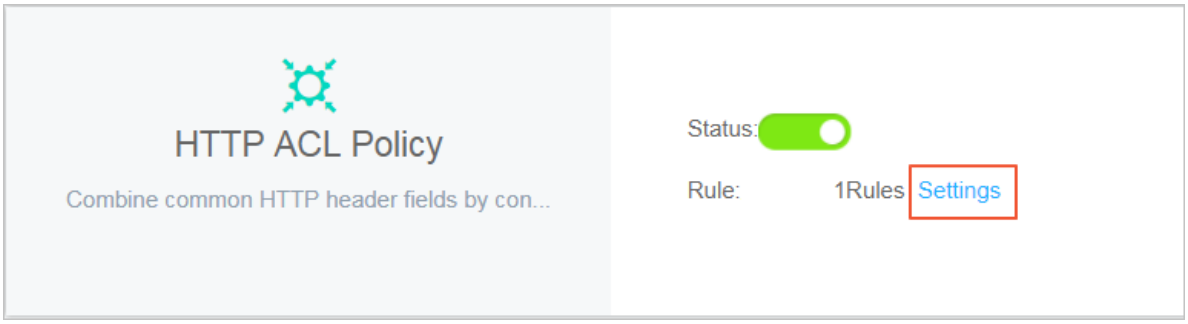
You can set a whitelist or blacklist by configuring HTTP ACL policies in WAF. The whitelist and blacklist are only effective on the specific domain that has the HTTP ACL policy configured.

Procedure

Follow these steps to configure a whitelist or blacklist:

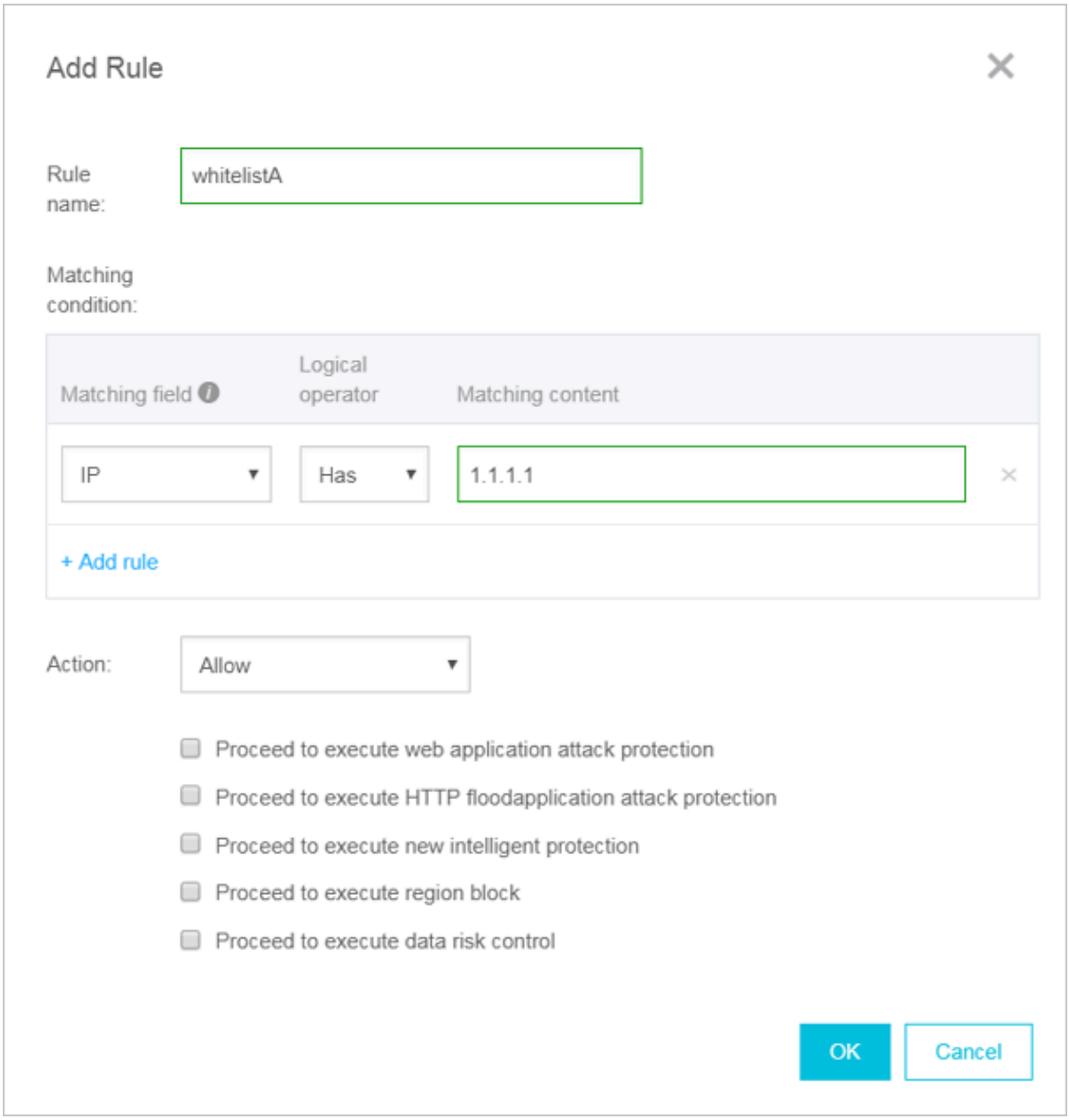
Note:
Make sure that you have added your domain to the WAF protection list before proceeding with the following operations. For more information, see *WAF deployment guide*.

1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.
4. Enable HTTP ACL Policy, and click Settings.



5. Click Add Rule.

   - Whitelist configuration example. Use the following configuration to allow all requests from IP 1.1.1.1.



> **Note:**
> If you want to allow all requests from this IP, do not select any "Proceed to …" protection option in the Add Rule dialog box. If any protection option is selected, some requests from this IP can still be blocked.

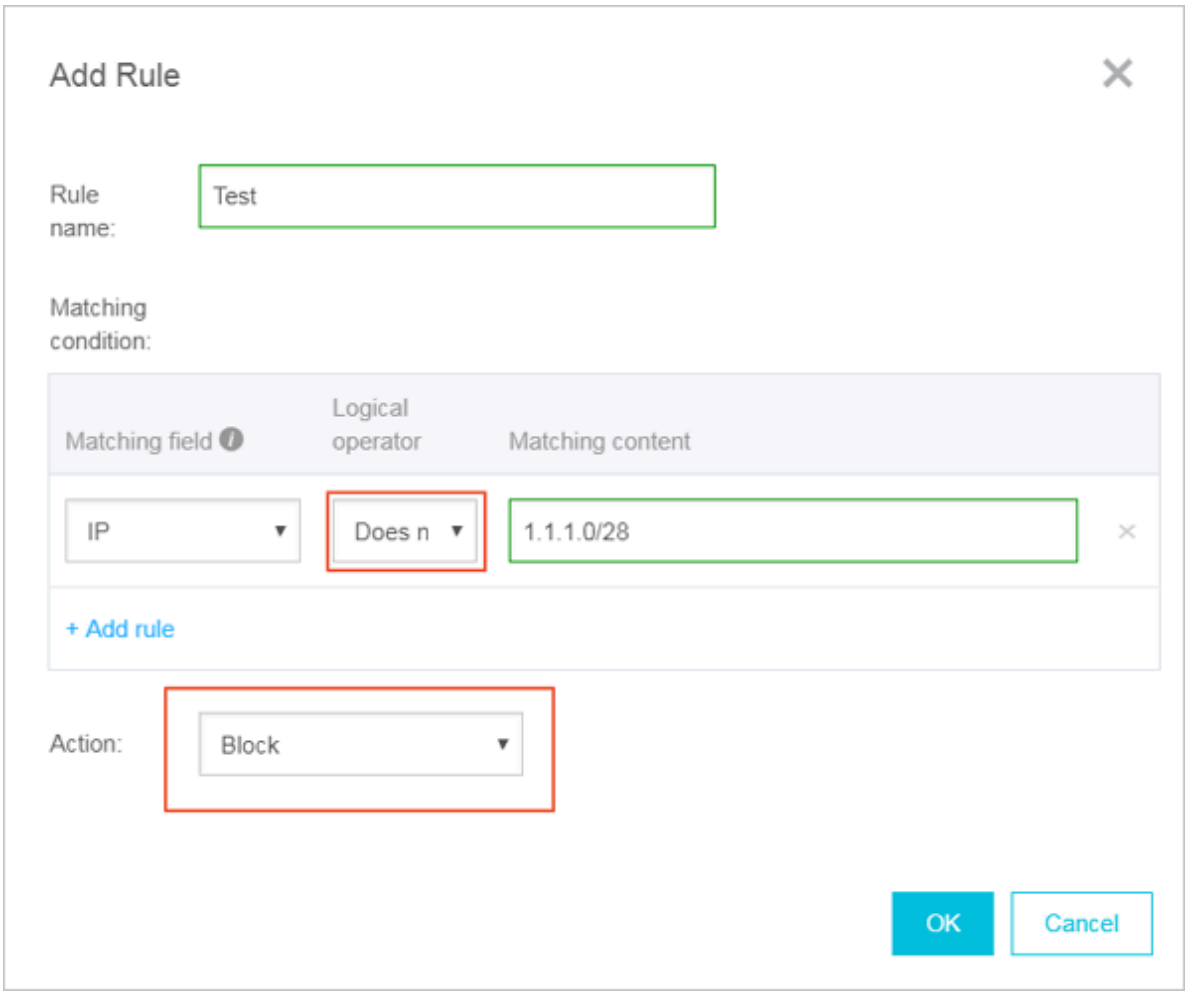
   - Similarly, you can also follow this procedure to set blacklist for a specific domain.

Note

- A rule supports up to three matching conditions. All conditions in a rule must be matched to trigger the rule. If you want to whitelist or blacklist multiple discrete IP addresses/IP segments, you must configure multiple HTTP ACL rules. For example, to block access requests from 1.1.1.1, 2.2.2.2, and 3.3.3.3, you must configure three rules separately.

Rule name	Rule condition	Action
blacklistC	RequestIP Has 3.3.3.3	Block
blacklistA	RequestIP Has 1.1.1.1	Block
blacklistB	RequestIP Has 2.2.2.2	Block

- The IP matching filed in HTTP ACL rules supports mask format (for example, 1.1.1.0/24), and the logical operator supports “does not have”. For example, you can use the following configuration to only allow requests from specific IP segment to one domain.



- Priority exists among multiple HTTP ACL rules. WAF applies the HTTP ACL rules according to the displayed sequence (from top to bottom) of HTTP ACL rules in the HTTP ACL Policy list. Additionally, you can click Sort Rules to change the priority among the HTTP ACL rules.

4.8 Data risk control

Data risk control helps you protect critical business interfaces (such as registration, login, activity, and forum) on your website against fraud.

Function description

Based on Alibaba Cloud's big data capabilities, Data risk control leverages industry-leading risk decision engines and human-machine identification technologies to protect critical businesses from fraud in different situations. By implementing Alibaba Cloud WAF (WAF) for your website, you can access data risk control without any modification to the server or client.

Data risk control is applicable to (but not limited to) the following scenarios:

- Zombie accounts
- SMS verification code floods
- Credential stuffing and brute force cracking
- Malicious snatching, flash sales, bonus hunting, and snatching of red packets
- Ticket scalping by machines, vote cheating, and malicious voting
- Spam messages

Procedure

Follow these steps to enable and configure data risk control:

> Note:
> Make sure you have implemented Alibaba Cloud WAF for your website before doing this configuration. For more information, see *Implement Alibaba Cloud WAF*.

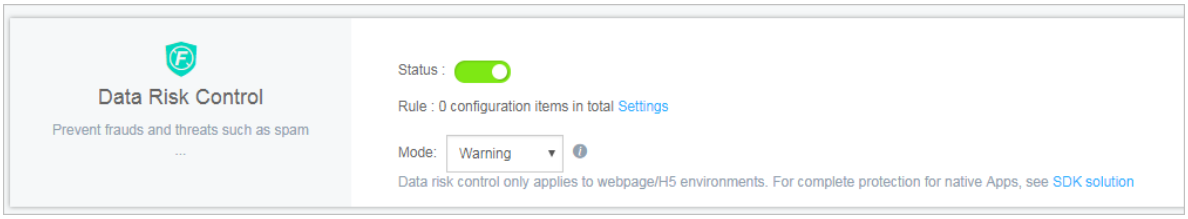
1. Log on to the *Alibaba Cloud WAF console*.

2. Go to the Management > Website Configuration page and select the region of your WAF instance (Mainland China or International).
3. Locate to the domain name to be configured and click Policies.
4. Under Data Risk Control, turn on the Status switch and confirm enabling this feature.

> Note:
> When enabled, Data risk control will inject JavaScript code into your webpage for detecting malicious behaviors, and disable all gzip compression settings. Even if your website uses a non-standard port, no additional configuration is required in data risk control. The JavaScript can be inserted into all webpages (default) or specific webpages. For more information, see *Insert JavaScript into specific webpages*.

5. Select a protection Mode:
   - Warning: Allow all requests and record suspicious requests in logs.
   - Protection: For suspicious requests, ask the client to finish the slider verification to continue.

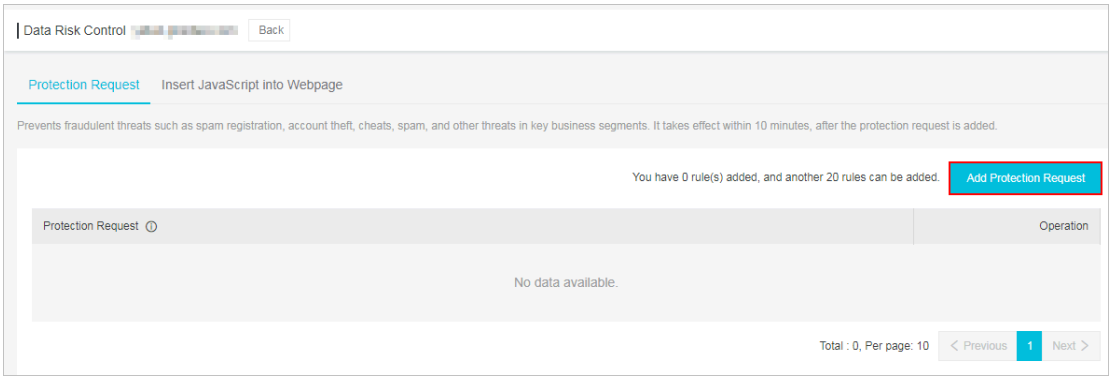
> Note:
> The warning mode is used by default. Data risk control does not block any request, but injects JavaScript code into webpages to analyze behaviors on the client.



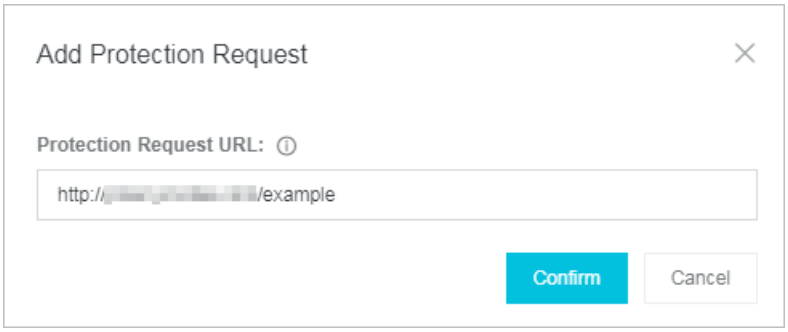
6. Click Settings to add protection requests or specify the webpages to insert JavaScript.

   · Add a protection request

   a. On the Protection Request tab page, click Add Protection Request.



   b. In the Add Protection Request dialog box, enter the exact Protection Request URL to be protected.



   What is the Protection Request URL

   Protection Request URL is the interface address where business actions are performed instead of the webpage's address. Take the following registration page as an example.

   In this example, the registration page is `www . abc . com / new_user` where users can submit a registration request. To submit a registration request, users must perform the SMS verification and agree to registration.

The business interfaces that work in this scenario are `www . abc . com / getsmscode` and `www . abc . com / register . do` .

In this case, you can add two protection requests to protect URL `www . abc . com / getsmscode` and `www . abc . com / register . do` against SMS interface abuse and zombie registration.

If you configure the request URL as `www . abc . com / new_user` , a validation slider will pop up when a user accesses the registration page. This will affect the user experience.

Note on specifying the Protection Request URL

- The request URL must be an exact URL. A fuzzy match is not supported.

  For example, if `www . test . com / test` is specified, the protection only applied to the www.test.com/test interface. Any subdomain page (for example www.test.com/test/abc) is not affected.
- You can use /* to apply data risk control to all paths under a web directory.

  For example, if `www . test . com / book /*` is specified, the protection applied to all paths under `www . test . com / book` . We recommend that you do not apply data risk control to full site (for example, use `www . abc . com /*` as the protection request URL). Because users will be required to finish the slider verification even on the homepage, which may reduce the user experience.
- We recommend that you do not configure a URL that is normally accessed directly by users without a series of previous visits. Because the user experience will be affected if the user is required to complete the slider verification without a series of previous visits.
- Data risk control does not apply to the direct API call scenario, and such calls may be blocked by data risk control. Because API calls are directly initiated machine actions, these calls cannot pass the human-machine identification of data risk control. If the API service is called by a user

operation (such as clicking a button in the console), data risk control can be applied.

c. Click Confirm.

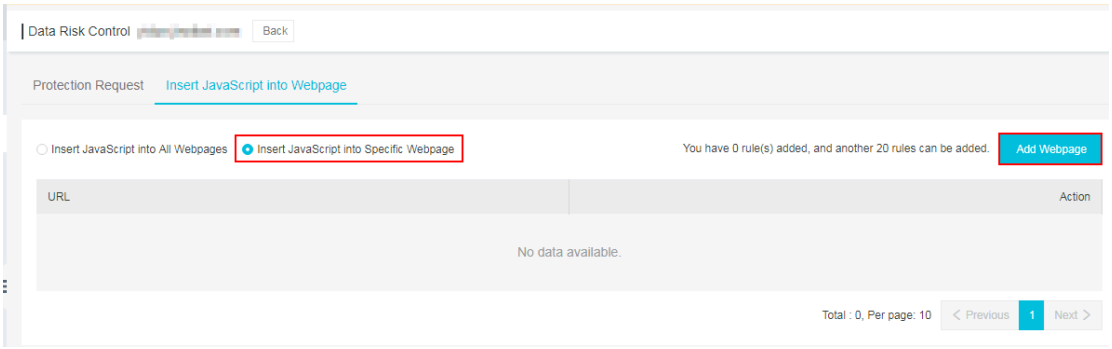
The successfully added protection request takes effect in about ten minutes.

- Specify a webpage to insert the Data risk control JavaScript

In case not all your webpages are compatible with the Data risk control JavaScript, you can insert JavaScript into specific webpages.

> Note:
> Not inserting Data risk control JavaScript into all webpages may weaken the protection effectiveness, because data risk control cannot perceive all user behaviors.

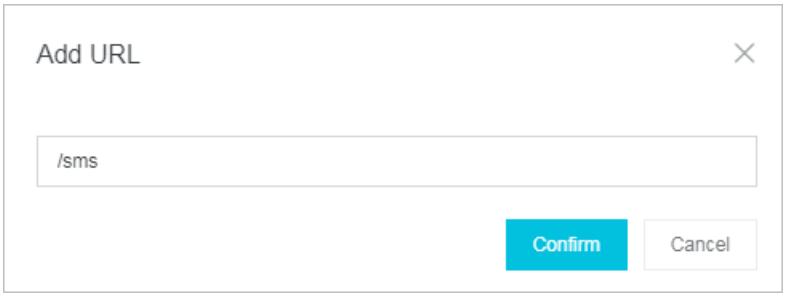
a. On the Insert JavaScript into Webpage tab page, click Insert JavaScript into Specific Webpage.



b. Click Add Webpage.

> Note:
> You can add up to 20 webpages.

c. In the Add URL dialog box, enter a specific URI (starting with "/?) under the domain name to protect, and click Confirm.



Data risk control only inserts the JavaScript into the specified paths.

After data risk control is enabled, you can use the logs feature of Alibaba Cloud WAF to view the protection results. For more information about a log example, see *Data risk control logs*.

Use case

A user, Tom, has a website with the domain name `www.abc.com`. Common users can register as members at `www.abc.com/register.html`.

Recently, Tom found out that hackers frequently submit registration requests by using malicious scripts. The hackers register a large number of zombie accounts to participate in the prize draw activity that Tom organizes. (These hackers are known as econnoisseurs.) These requests are similar to normal requests, where the frequency is not high. Traditional HTTP flood protection methods have problems identifying malicious requests of this kind.

Tom adds the website to WAF for protection, and enables data risk control for the domain name `www.abc.com`. As the business at `www.abc.com/register.html` is the most important to Tom, he configures specific request protection for this URL.

From the moment the configuration takes effect, WAF will do the following:

- Observes and analyzes whether the behaviors of users who access the domain name `www.abc.com` (including the homepage and its subpaths) are abnormal. WAF refers to Alibaba Cloud's reputation database to determine whether this source IP address is risky.
- A user submits a registration request to `www.abc.com/register.html`. Because this URL is configured for request protection in WAF, WAF will determine if the user is suspicious based on user behavior and reputation from the moment the user accesses the webpage to when the user submits the registration request.

For example, if a user doesn't perform any prior actions but directly submits a registration request, the user is suspicious.

- If WAF finds the request to be suspicious or this client IP address has a bad record, a validation slider pops up for user authentication. The authenticated user can continue to register.
  - If the user passes the slider validation in a suspicious way (for example, use scripts to simulate a real person's sliding process), WAF will continue to perform other validation tests.
  - If the user cannot pass the validation, WAF will block this request.
- If WAF finds this is a common user based on the preceding behaviors, he or she can finish the registration process without any intervention.

Data risk control is enabled for the entire domain name (`www . abc . com`) during the process. This means that WAF will insert JavaScript into all the pages with this domain name to determine whether the client is trusted. The real protection and validation are targeted at the interface `www . abc . com / register . html` . WAF will intervene when this interface is requested. If the preceding behaviors of the client are trusted, WAF will not intervene. Otherwise, the user must pass the validation to continue the operation.

Data risk control logs

You can use the *Logs* feature of Alibaba Cloud WAF to troubleshoot the monitoring and blocking situations of data risk control. For example,

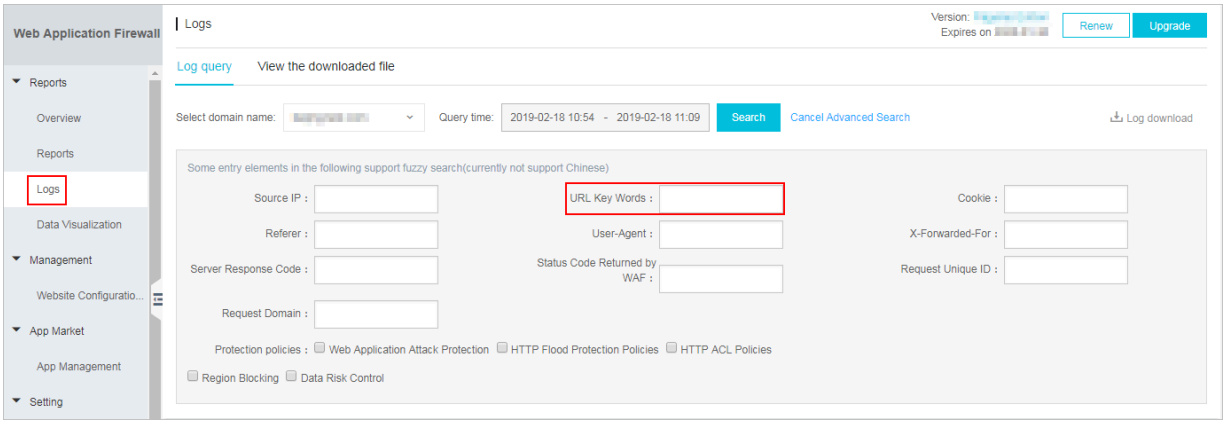
- The following figure shows the log that the user passed the validation test of data risk control.

When a common user who has passed the data risk control validation requests a URL, the URL has a parameter that begins with ua. This request will be sent to the origin and get a normal response.

- The following figure shows the blocking logs of data risk control.

If the user directly requests this interface, the URL typically does not have a parameter that begins with ua (or a parameter with forged ua). The request will be blocked by WAF, and the origin response cannot be seen in the corresponding logs.

You can use the *Logs* feature to configure and enable the data risk control interface in Advanced Search > URL Key Words. You can use this interface to troubleshoot the blocking logs.



4.9 Website tamper-proofing

Website tamper-proofing allows you to lock specific web pages and manually cache the intact content as the server response to prevent malicious tampering. When a locked web page is requested, Alibaba Cloud WAF (WAF) responds with the cached content.

Context

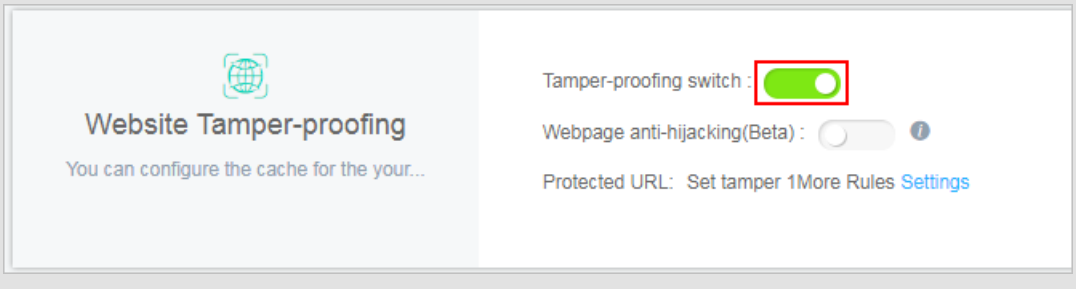
Note:
Make sure that you have implemented WAF for your website before performing this configuration. For more information, see *Implement Alibaba Cloud WAF*.

Procedure

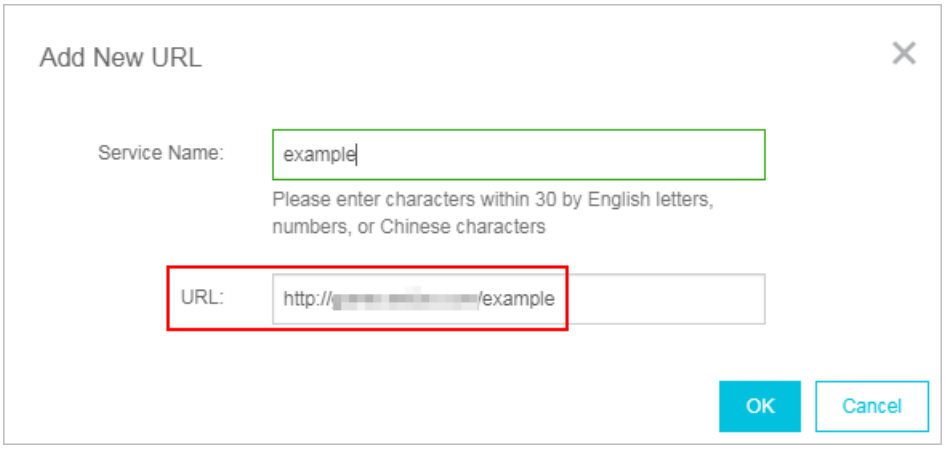
1. Log on to the *Alibaba Cloud WAF console*.

2. Go to the Management > Website Configuration page and select the region of your WAF instance (Mainland China or International).
3. Locate to the domain name to be configured and click Policies.
4. Enable Website Tamper-proofing and click Settings.

Note:
If you no longer need the website tamper-proofing feature, you can disable it on this page.

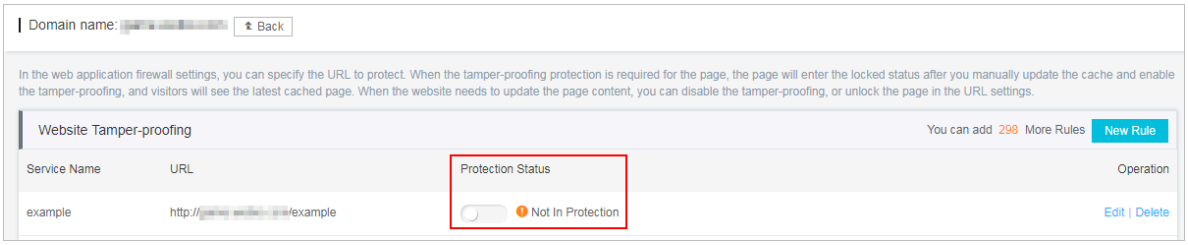


5. Click New Rule and complete the configuration in the Add New URL dialog box.

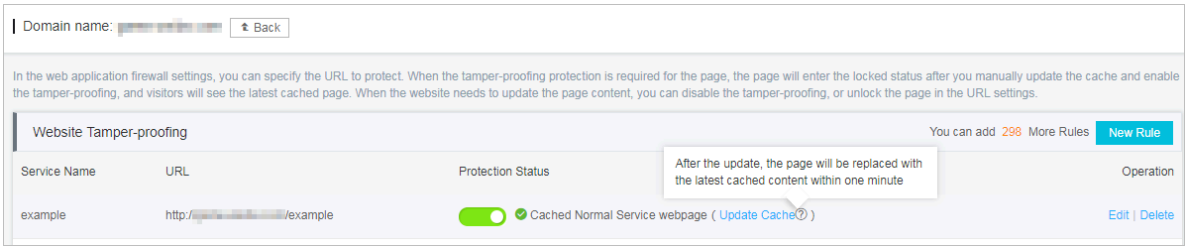


- Service Name: Name this rule.
- URL: Specify the exact path of the web page to be protected. Wildcard characters (such as `/*`) or parameters (such as `/ abc ? xxx =`) are not supported. WAF can protect all text, HTML, and pictures under this path against tampering.

6. When the rule is successfully added, turn on the Protection Status switch to enable it, that it, lock the specified web page and cache the latest content as the server response. If you do not enable the rule, the settings do not take effect.



7. When the locked web page is updated, you must click Update Cache to cache the latest content. If you do not perform this operation, WAF always returns the last cached content.



4.10 Data leakage prevention

The data leakage prevention function allows Web Application Firewall (WAF) to comply with China’s Cyber Security Law that stipulates that “network operators should take technical measures and other necessary measures to guarantee the security of personal information they collect and prevent information leaks, damages, and loss. In the event of, or possible occurrence of, any personal information leaks, damages, or loss, the network operators involved shall immediately take remedial measures, notify users in a timely manner, and report the case to competent authorities in accordance with the provisions.”

Function description

The data leakage prevention function provides desensitization and warning measures for sensitive information leaks on websites (especially mobile phone numbers, ID card numbers, and credit card information) and the leakage of sensitive keywords. It also allows you to block specified HTTP status codes.

You must upgrade WAF to the Business or Enterprise edition to use this function. For more information, see *Renewal and upgrade*.

Common information leak situations faced by websites include:

- Unauthorized access to a URL, such as unauthorized access to the website management background.
- Excessive permission access vulnerabilities, such as horizontal excessive permission access vulnerabilities and vertical excessive permission access vulnerabilities.
- Sensitive information crawled by malicious crawlers on webpages.

The data leakage prevention function can do the following tasks for you:

- Detects and identifies private and sensitive data generated on the webpage and offers protection measures, such as early warnings and the shielding of sensitive information, to avoid website operation data leaks. This sensitive and private data includes, but is not limited to, ID card numbers, mobile phone numbers, and bank card numbers.
- Supports one-click blocking of sensitive server information that may expose the web application software, operating systems, and versions used by the website to avoid leaks of sensitive server information.
- Using a built-in illegal and sensitive keyword library, the function provides warnings, illegal keyword shielding, and other protective measures to deal with illegal and sensitive keywords that appear on webpages.

How it works

The data leakage prevention function detects if response pages have ID card numbers , mobile phone numbers, bank card numbers, and other types of sensitive informatio n. If it discovers a sensitive information match, it sends a warning or filters the sensitive information based on the action configured for the matching rule. When sensitive information is filtered, the sensitive portion of the information is replaced by asterisks (*) to protect it.

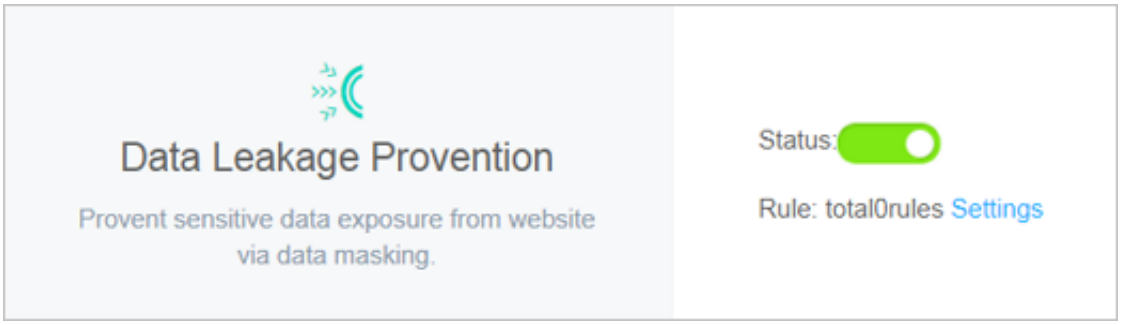
The data leakage prevention function supports Content-Types including `text /*`, `image /*`, and `applicatio n /*` and covers web terminals, app terminals, and API interfaces.

Procedure

Follow these steps to enable and configure Data Leakage Prevention:

Note:
Make sure that you have added your domain to the WAF protection list before proceeding with the following operations. For more information, see *CNAME access guide*.

1. Log on to the *Web Application Firewall console*.
2. Go to the Management > Website Configuration page, and select the region of your WAF instance (Mainland China or International).
3. Select the domain to be configured, and click Policies.
4. Enable the Data Leak Prevention function and click Settings.

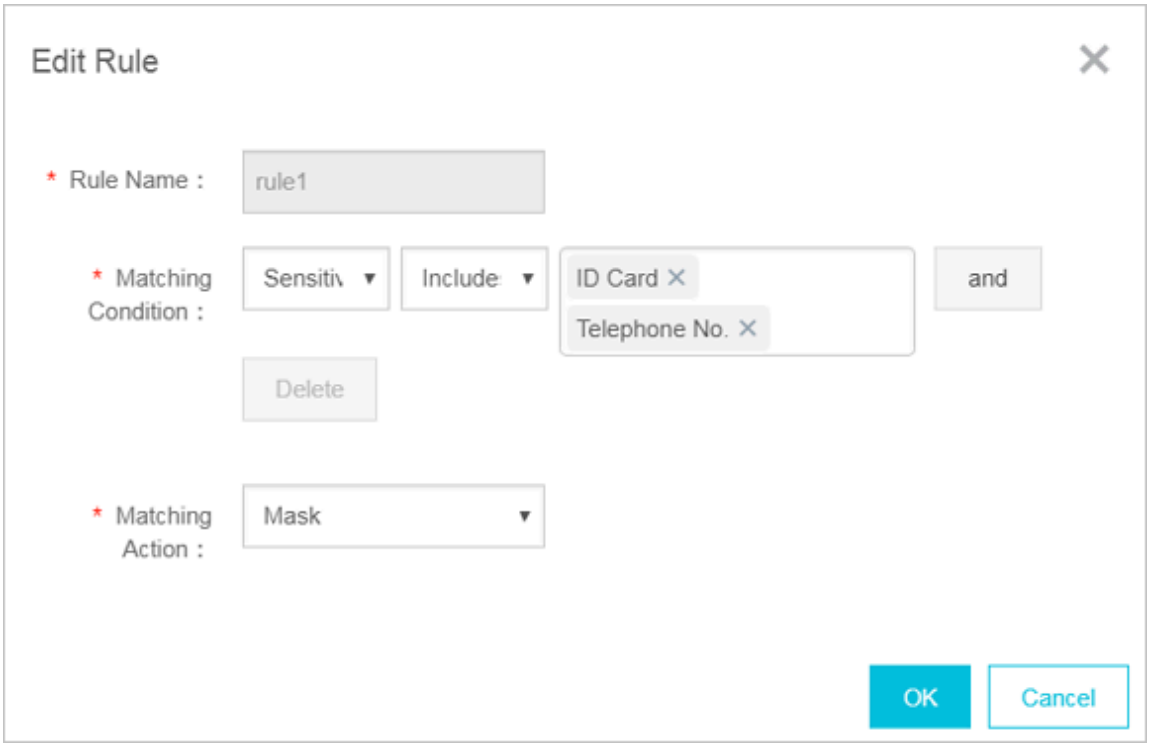


5. Click Add Rule to add a sensitive information protection rule.

Note:
In the Add Rule dialog box, you can click and to add more URL matching conditions.

- Sensitive information masking: For webpages that may display mobile phone numbers, ID card numbers, and other sensitive information, configure the relevant rules to mask this information or provide warnings. For example, you

can set the following protection rule to protect mobile phone numbers and ID card numbers by data masking.

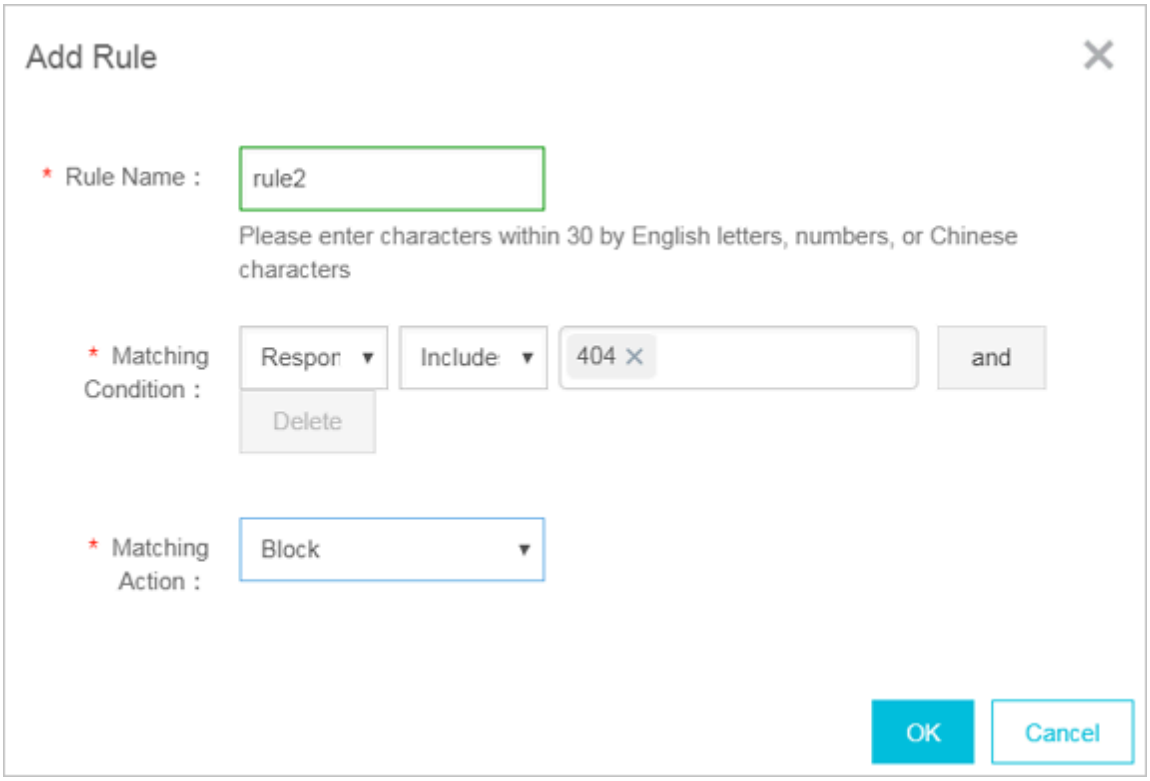


After setting this protection rule, mobile phone and ID card numbers displayed on all webpages in this website are automatically desensitized.

Note:
When a webpage has business contact phone numbers, support hotline numbers, and other mobile phone numbers that are to be provided to the

public, these may also be filtered out by the configured mobile phone number sensitive information filtering rule.

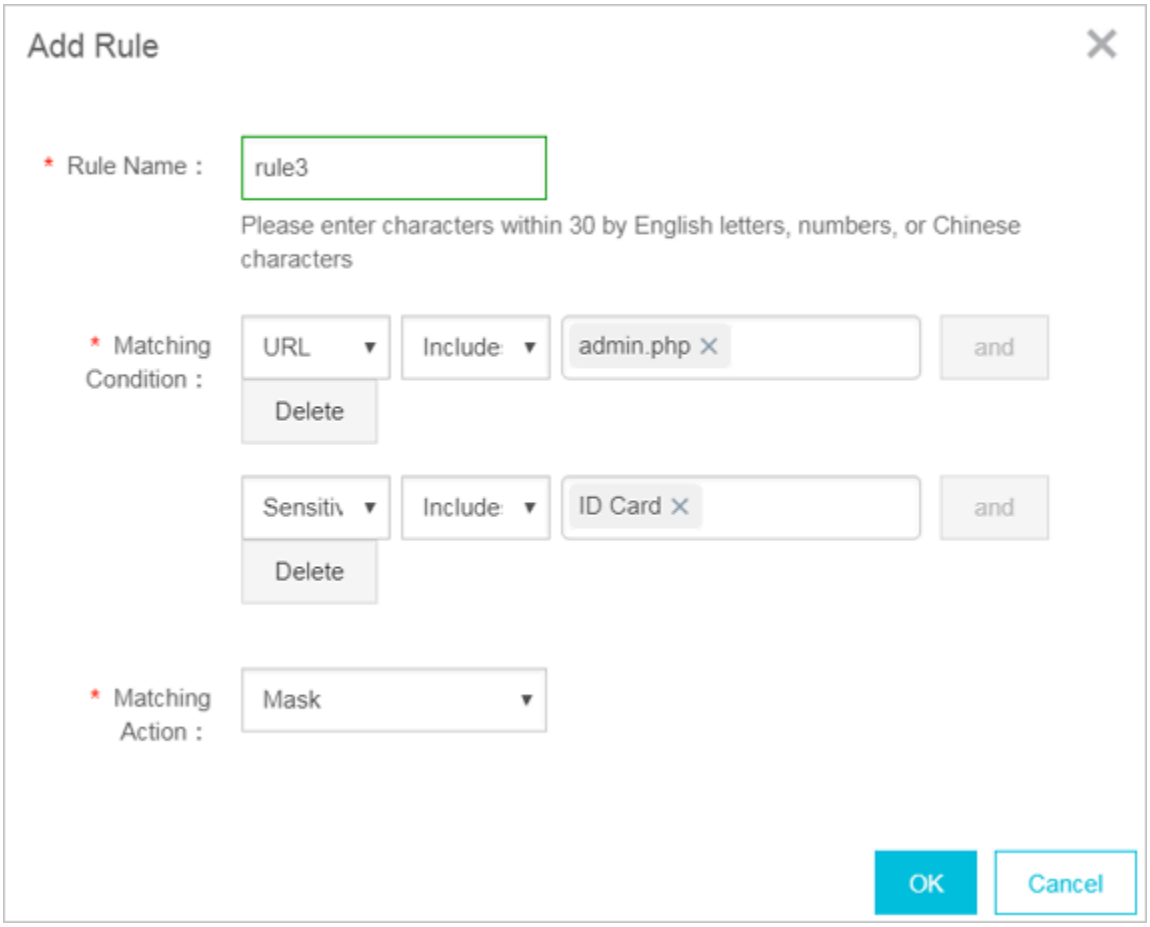
- Status code blocking: You can set rules to block or warn of specific HTTP request status codes to avoid leaking sensitive server information. For example, you can set the following protection rule to block HTTP 404 status codes.



After setting this protection rule, when users request a page that does not exist under this website, the specified page is returned.

- Filter sensitive information of specified URLs: For specified webpage URLs that may display mobile phone numbers, ID card numbers, and other sensitive information, configure the relevant rules to filter this information or provide

warnings. For example, you can set the following protection rule to filter ID card numbers on the webpage admin.php.



After setting this protection rule, ID card numbers are desensitized on the admin.php webpage.

6. For an added rule, you can also Edit or Delete it.

After enabling the Data Leak Prevention function, you can log on to the *Web Application Firewall console*, and go to the Reports > Attack Protection page to view protection reports. This report allows you to query logs of access requests filtered out or blocked by data leakage prevention rules.

4.11 IP blocking

IP blocking helps you automatically block client IP addresses that launch multiple Web attacks on your domain within a short period of time.

Prerequisites

You can enable this feature in Web Application Firewall (WAF) only when the following conditions are met:

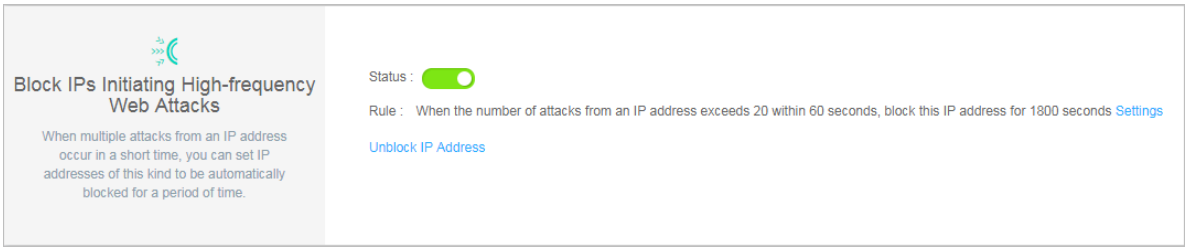
- You have bought a monthly or yearly subscription WAF service. For more information, see *Activate Alibaba Cloud WAF*.
- You have added your domain to WAF for protection. For more information, see the "*Configure WAF* " part of the "Overview" section in Alibaba Cloud WAF User Guide.
- You have enabled Web application protection and HTTP flood protection. For more information, see *Web application protection* and *HTTP flood protection*.

Context

You can enable the IP blocking feature to automatically detect and block client IP addresses that launch multiple Web attacks on your domain within a short period of time. Requests from the blocked IP addresses are rejected during the blocking period. After the blocking period expires, the blocked IP addresses are automatica lly unblocked. After enabling IP blocking, you can customize a protection rule. For more information, see Step 5. You can also unblock IP addresses manually. For more information, see Step 6.

Procedure

1. Log on to the *WAF console*.
2. In the left-side navigation pane, choose Management > Website Configuration. On the Website Configuration page that appears, select the region of your WAF instance (Mainland China or International).
3. Find the domain to be configured in the domain list, and click Policies in the Operation column.
4. On the page that appears, scroll down to the Block IPs Initiating High-frequency Web Attacks area and turn on Status to enable IP blocking.

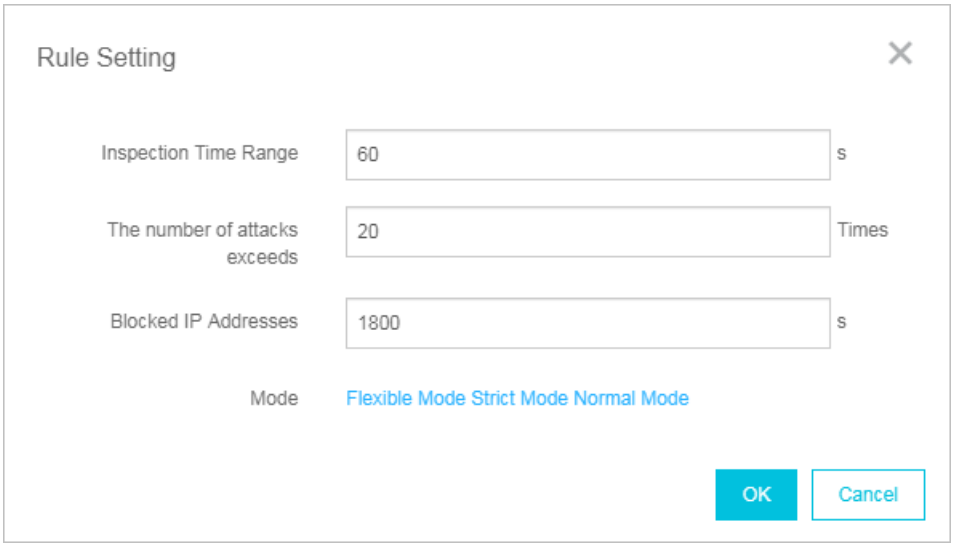


After IP blocking is enabled, the following protection rule takes effect by default: If WAF detects that a client IP address has launched more than 20 Web attacks on the specified domain within 60 seconds, WAF blocks the IP address for 1,800 seconds.

5. Optional: You can perform the following steps to customize a protection rule:
   a) In the Block IPs Initiating High-frequency Web Attacks area, Click Settings.
   b) In the Rule Setting dialog box that appears, set the following parameters.

> Note:
> If you do not know how to set these parameters, set Mode to one of the following values: Flexible Mode, Strict Mode, and Normal Mode. Each of these values correspond to a default protection rule that is configured to a certain degree of strictness. You can adjust the settings in these rules to customize the degree of strictness.

Parameter	Description
Inspection Time Range	The period of time at which WAF checks for Web attacks from client IP addresses on the specified domain. Unit: second.
The number of attacks exceeds	The maximum number of Web attacks that a client IP address can launch on the specified domain within the specified period of time. If the number of Web attacks from a client IP address exceeds the value of this parameter, WAF blocks this IP address.
Blocked IP Addresses	The period of time over which a client IP address is blocked. Unit: second.



   c) Click OK.
6. Optional: To manually unblock client IP addresses, click Unblock IP Address in the Block IPs Initiating High-frequency Web Attacks area.

4.12 Directory traversal protection

Directory traversal protection helps you automatically block client IP addresses that launch multiple directory traversal attacks on your domain within a short period of time.

Prerequisites

You can enable this feature in Web Application Firewall (WAF) only when the following conditions are met:

- You have bought a monthly or yearly subscription WAF service. For more information, see *Activate Alibaba Cloud WAF*.
- You have added your domain to WAF for protection. For more information, see the "*Configure WAF* " part of the "Overview" section in Alibaba Cloud WAF User Guide.
- You have enabled Web application protection and HTTP flood protection. For more information, see *Web application protection* and *HTTP flood protection*.

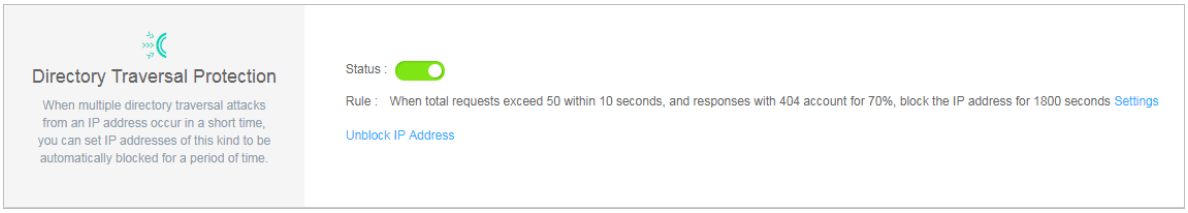
Context

You can enable the directory traversal protection feature to automatically detect and block client IP addresses that launch multiple directory traversal attacks on your domain within a short period of time. Requests from the blocked IP addresses are rejected during the blocking period. After the blocking period expires, the blocked IP addresses are automatically unblocked. After enabling directory traversal protection , you can customize a protection rule. For more information, see Step 5. You can also unblock IP addresses manually. For more information, see Step 6.

Procedure

1. Log on to the *WAF console*.
2. In the left-side navigation pane, choose Management > Website Configuration. On the Website Configuration page that appears, select the region of your WAF instance (Mainland China or International).
3. Find the domain to be configured in the domain list, and click Policies in the Operation column.

4. On the page that appears, scroll down to the Directory Traversal Protection area and turn on Status to enable directory traversal protection.



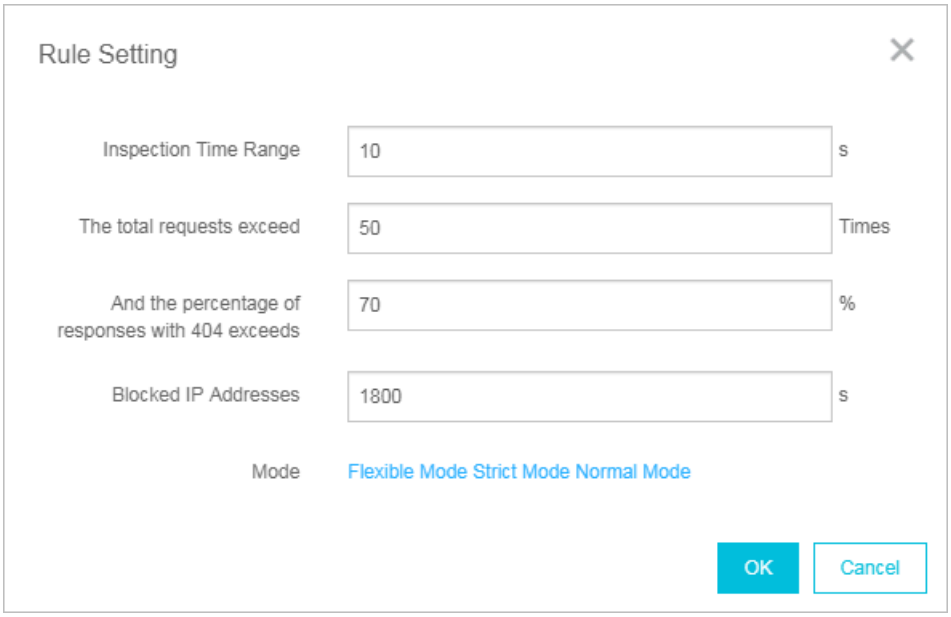
After directory traversal protection is enabled, the following protection rule takes effect by default: If WAF detects more than 50 access requests from a client IP address to the specified domain within 10 seconds and that more than 70% of the responses to these requests contain the 404 response code , WAF blocks the IP address for 1,800 seconds.

5. Optional: You can perform the following steps to customize a protection rule:
   a) In the Directory Traversal Protection area, click Settings.
   b) In the Rule Setting dialog box that appears, set the following parameters.

> **Note:**
> If you do not know how to set the parameters, set Mode to one of the following values: Flexible Mode, Strict Mode, and Normal Mode. Each of these values correspond to a default protection rule that is configured to a certain degree of strictness. You can adjust the settings in these rules to customize the degree of strictness.

Parameter	Description
Inspection Time Range	The period of time at which WAF checks for directory traversal attacks from client IP addresses on the specified domain. Unit: second.
The total requests exceeds	The maximum number of access requests that can be sent from a client IP address to the specified domain within the specified period of time. WAF blocks a client IP address when both of the following conditions are met: The number of access requests from the IP address to the specified domain within the specified period of time is greater than the value of this parameter, and the percentage of responses to these requests with the 404 response code exceeds the specified threshold.
And the percentage of responses with 404 exceeds	

Parameter	Description
Blocked IP Addresses	The period of time over which a client IP address is blocked. Unit: second.



c) Click OK.

6. Optional: To manually unblock client IP addresses, click Unblock IP Address in the Directory Traversal Protection area.

4.13 Threat intelligence

Threat intelligence helps you automatically block access requests from common vulnerability scanners or from IP addresses in the Alibaba Cloud library of identified port scan attackers.

Prerequisites

You can enable this feature only when the following conditions are met:

- You have bought a monthly or yearly subscription WAF service. For more information, see *Activate Alibaba Cloud WAF*.
- You have added your domain to WAF for protection. For more information, see the "*Configure WAF* " part of the "Overview" section in Alibaba Cloud WAF User Guide.
- You have enabled Web application protection and HTTP flood protection. For more information, see *Web application protection* and *HTTP flood protection*.

Context

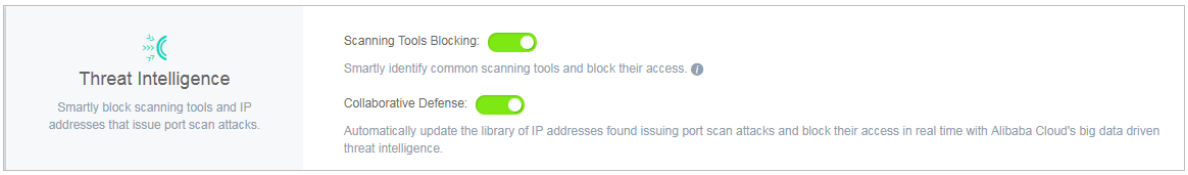
You can enable the threat intelligence feature to automatically block access requests from common vulnerability scanners, including sqlmap, Acunetix Web vulnerability scanner (AWVS), Nessus, AppScan, WebInspect, Netsparker, Nikto, and RSAS. You can also use the collaborative defense function of this feature to automatically block access requests from all IP addresses in the Alibaba Cloud global library of identified port scan attackers.

Procedure

1. Log on to the *WAF console*.
2. In the left-side navigation pane, choose Management > Website Configuration. On the Website Configuration page that appears, select the region of your WAF instance (Mainland China or International).
3. Find the domain to be configured in the domain list, and click Policies in the Operation column.
4. On the page that appears, scroll down to the Threat Intelligence area and enable or disable the protection functions as required.

   The following protection functions are available in threat intelligence:

   - Scanning Tool Blocking: identifies common vulnerability scanners and blocks their access requests.
   - Collaborative Defense: automatically blocks access requests from all IP addresses in the Alibaba Cloud global library of identified port scan attackers.



5 Reporting

5.1 Business and security overview

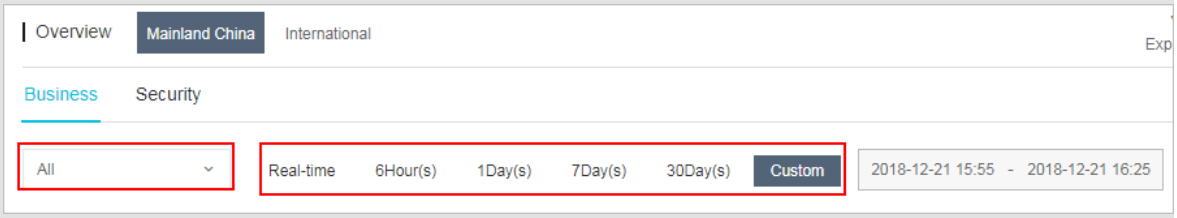
The Alibaba Cloud WAF Overview page gives you a glimpse of the business and security environment of a WAF-enabled site.

View business overview

Follow these steps to view the business overview page:

1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Reports > Overview page and select the region of your WAF instance (Mainland China or International).
3. On the Business tab page, select a domain name and time period to display the business summary of the specified domain name during the time period. The time period options include Real-time, 6 Hours, 1 Day, 7 Days, 30 Days, or Custom.

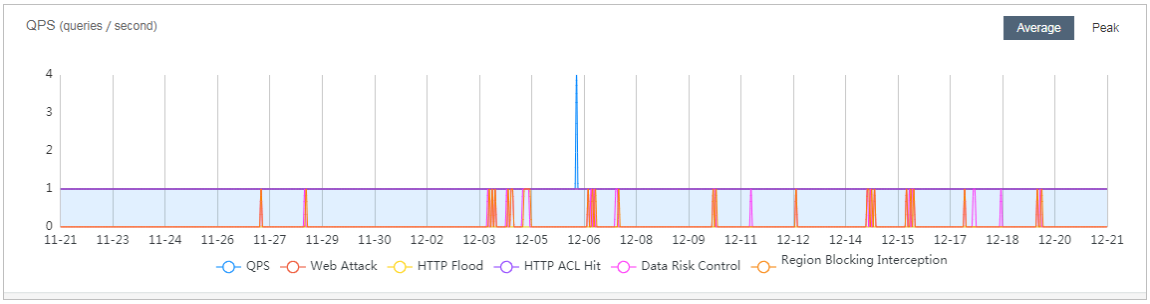
> **Note:**
> The business statistics for the last 30 days can be viewed. You can use Custom to specify a time period within the last 30 days to view the record.



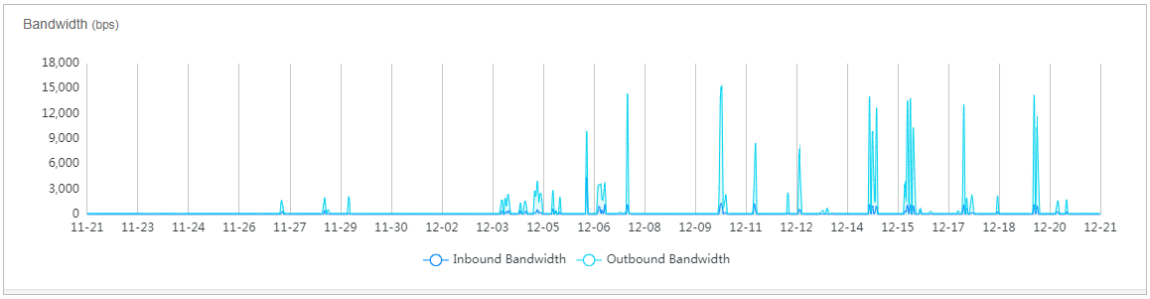
The business overview includes the following information:

- QPS: This graph displays all queries per second and the number of suspicious requests that hit the Web Attack, HTTP Flood, HTTP ACL, Data Risk Control, or Region Blocking Interception rules, in queries/second. The sampling interval is

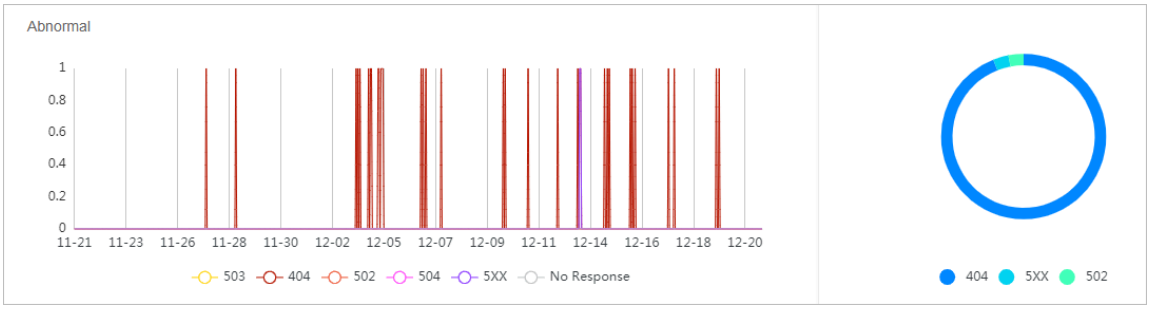
one minute. You can choose the data type (Average or Peak) to display or click the legend icon below the graph to clear or display the corresponding record.



- Bandwidth: This graph displays the inbound and outbound bandwidth, in bit/s. The sampling interval is one minute. You can click the legend icon below the graph to clear or display the corresponding record.

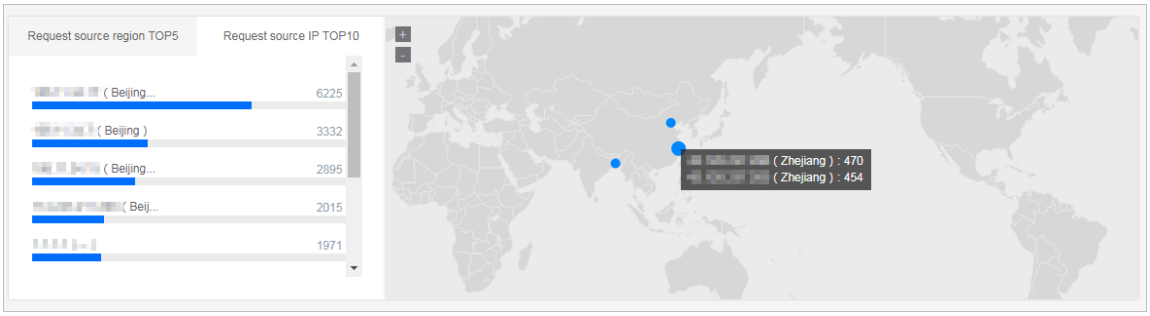


- Abnormal: This graph displays the number of HTTP error codes, such as 404, 502, 503, 504, 5XX, and No Response. The sampling interval is one minute. Next to the chart, a pie chart is provided showing the proportion of each error code. You can click the legend icon below the graph to clear or display the corresponding record.

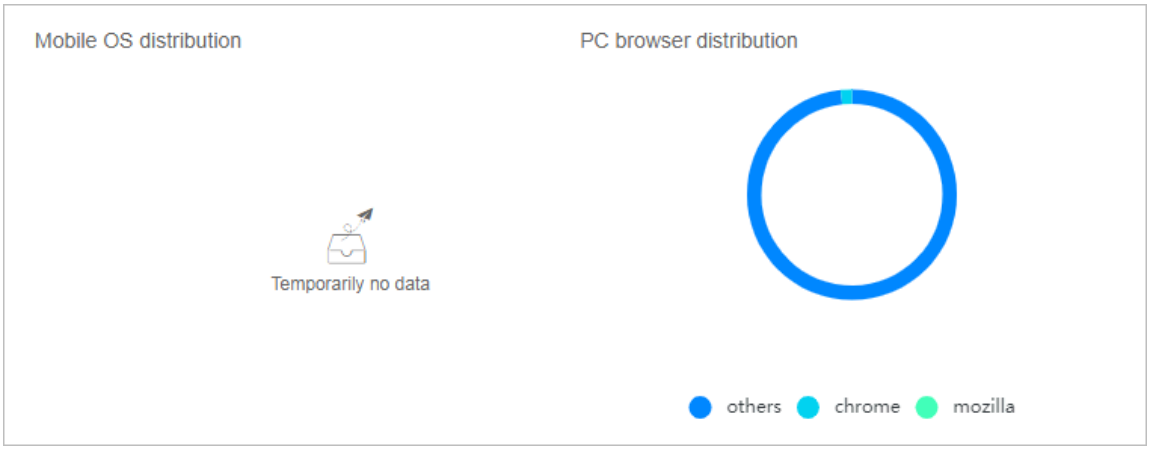


- Request source region TOP5 or Request source IP TOP10: This bar chart displays the top 5 regions that most requests originate from or the top 10 client IP addresses that send most requests. Next to the bar chart, a world map is

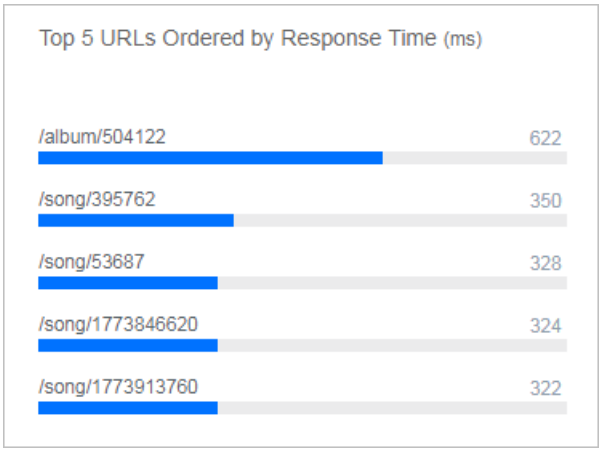
provided showing the corresponding IP location record. You can place the pointer over a blue dot to view details.



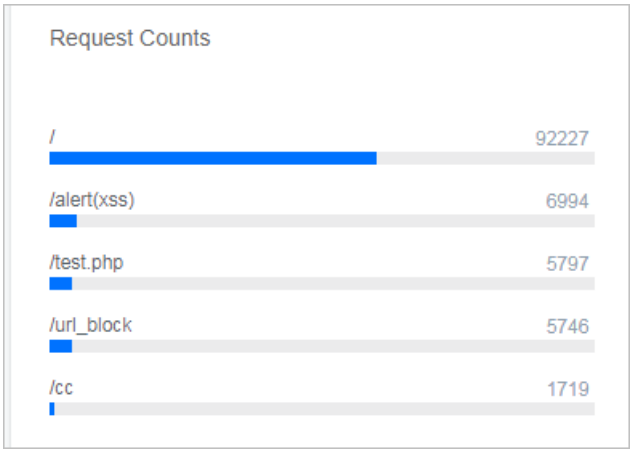
- Mobile OS distribution and PC browser distribution: These two pie charts display the system distribution of access requests from mobile or PC clients.



- Top 5 URLs Ordered by Response Time: This bar chart displays the top 5 URLs with the longest response time and their response time in ms.



- Request Counts: This bar chart displays the top 5 most frequently accessed paths and the corresponding request count.

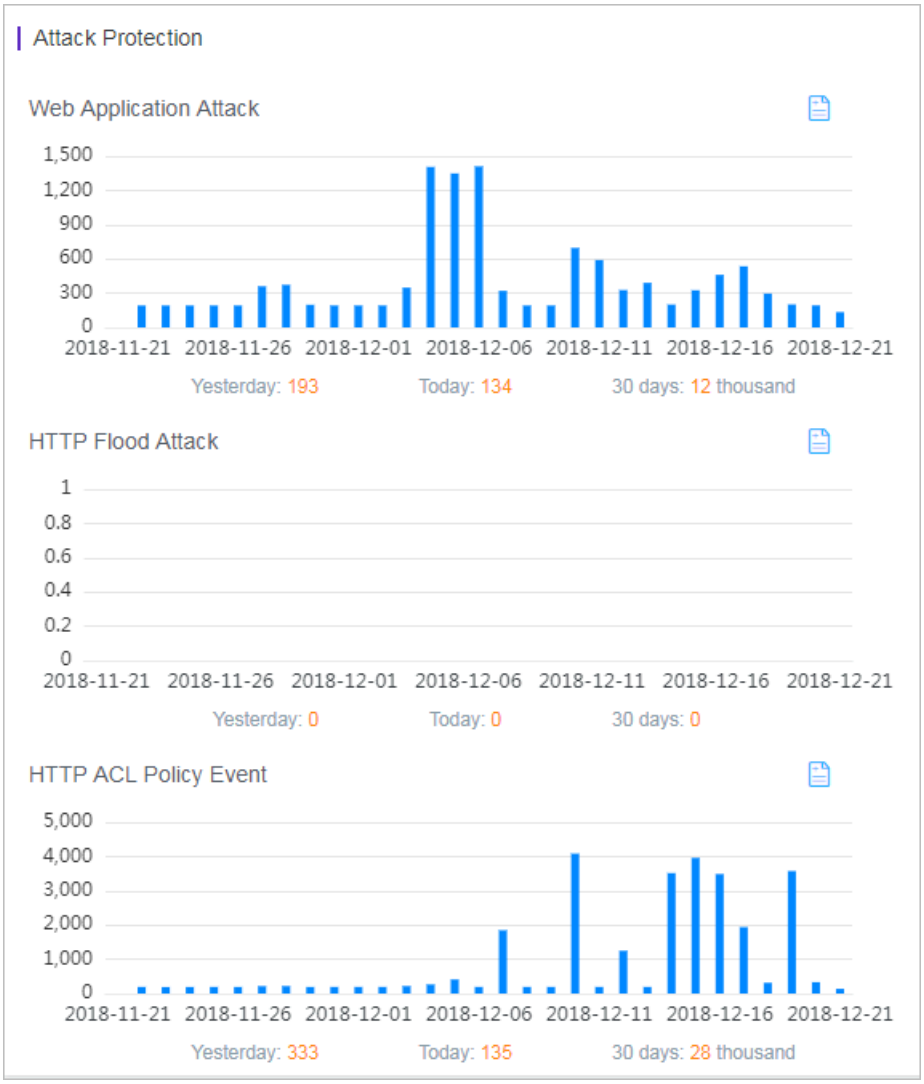


View security overview

Follow these steps to view the security overview page:

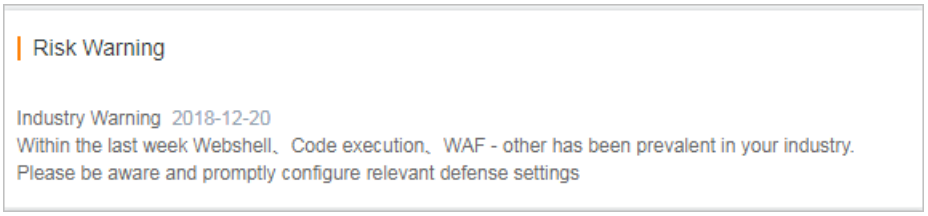
1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Reports > Overview page and select the region of your WAF instance (Mainland China or International).
3. Go to the Security tab page to view the following security summary information:
   - Attack Protection: These bar charts show statistics for the Web Application Attack, HTTP Flood Attack, and HTTP ACL Policy Event over the last 30 days. You

can place the pointer on a record to view details, or click the icon to go to the corresponding *Attack protection report*.

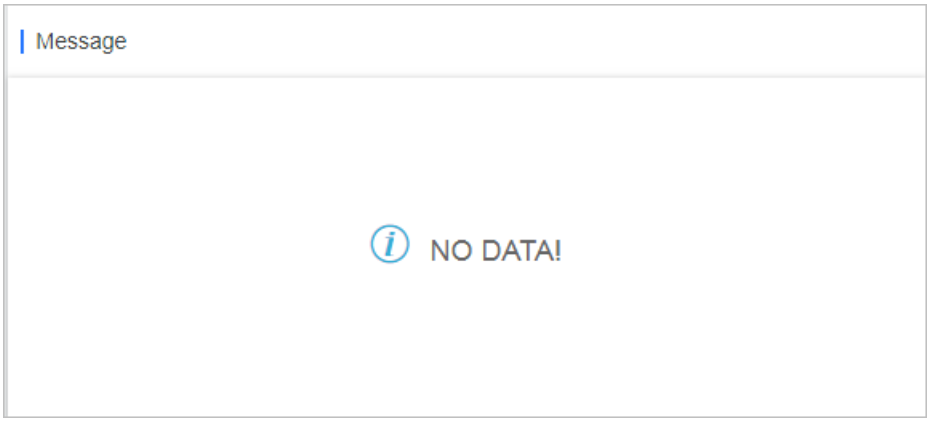


- Risk Warning: This area lists the new security risks that WAF finds on your site and the latest security risks in your industry. Protection suggestions are also

provided. You can click View reports to go to the corresponding *Risk warning report*.



- Message: This area lists WAF protection rule updates for the latest vulnerabilities. You can click View to view the corresponding vulnerability announcement.



5.2 WAF security reports

Alibaba Cloud WAF provides security reports for you to view and understand all protection actions of WAF. You can view the attack protection and risk warning statistics.

Background information

Alibaba Cloud WAF security reports include attack protection report and risk warning report.

- The attack protection report gives you an overall view of all Web application attacks, HTTP flood attacks, and HTTP ACL events.
- The risk warning report records and summarizes common attacks that occur on your network assets, and provides you with risk warning information. You can view the following risk warnings: known hacker attack, WordPress attack, suspected attack, robots script, crawler access, and SMS abuse.

Procedure

Follow these steps to view WAF security reports:

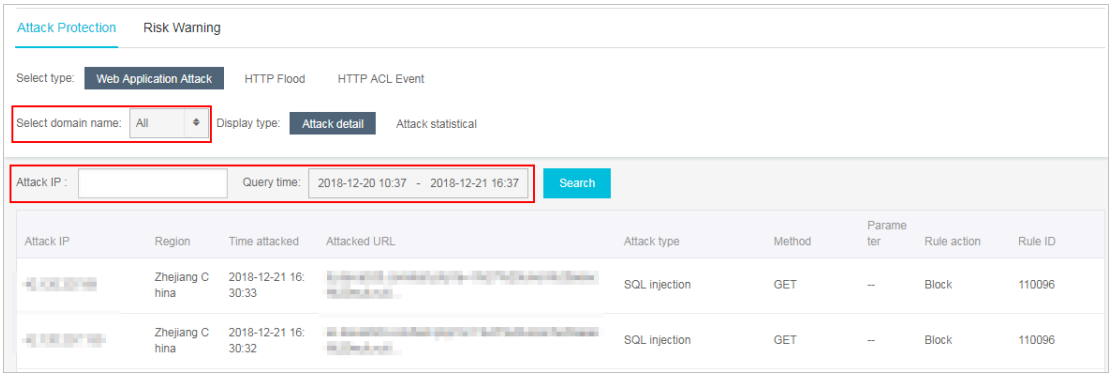
1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Reports > Reports page.
3. Go to the Attack Protection or Risk Warning tab page to view the corresponding report.
   - View attack protection report

     On the Attack Protection tab page, select the attack type to view the detailed records. You can view the following records:

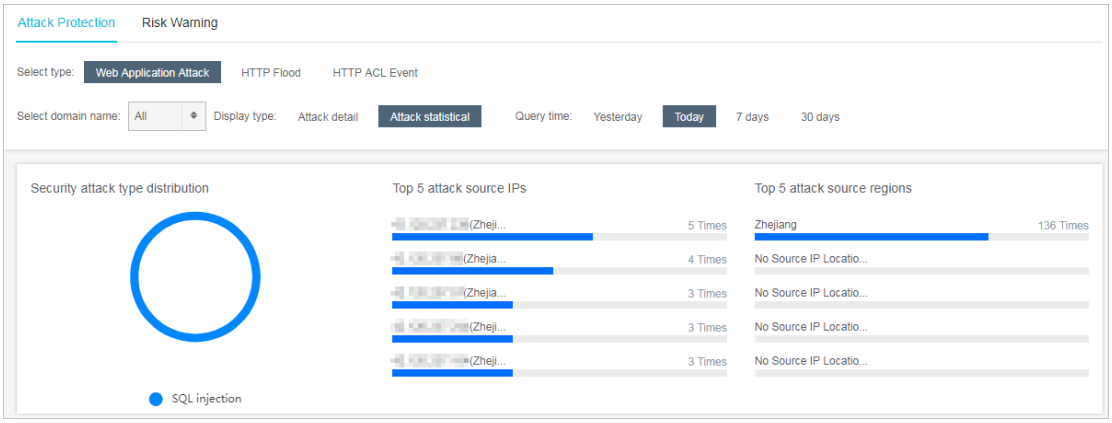
     - Web Application Attack: displays records of all Web attacks inspected by WAF. You can filter the records based on domain names, attack IP addresses, and attack time.

       Note:

For more information about web attack protection, see *Web application attack protection*.



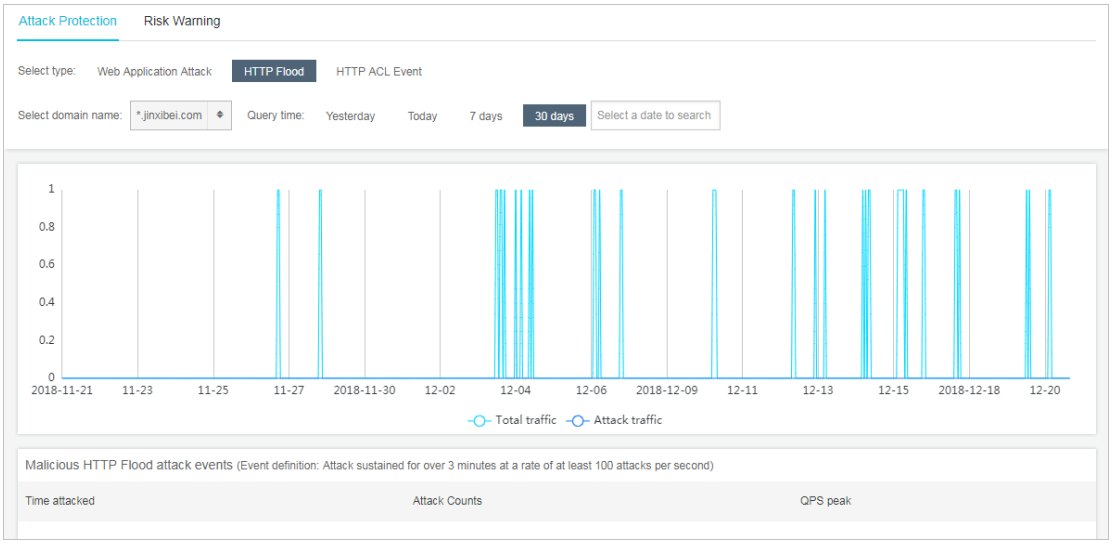
By default, the records are displayed in details. You can also view the attack statistics. Attack statistics displays the distribution of security attack types, top 5 attacker source IP addresses, and top 5 attacker source regions.



- HTTP Flood: displays the records of HTTP flood attacks inspected by WAF. You can select the domain name and query time to view the corresponding records.

Note:

For more information about HTTP flood attack protection, see *HTTP flood protection*.

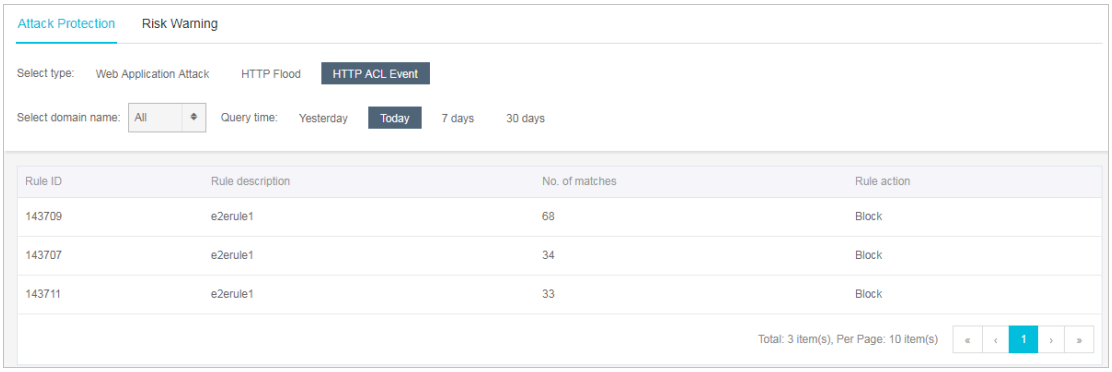


The real-time total QPS and attack QPS records are displayed at the top of the page, and all HTTP flood events are displayed at the bottom of the page. Alibaba Cloud WAF defines the HTTP flood attack as follows: attack duration > 3 minutes and attack frequency (per second) > 100.

- HTTP ACL Event: displays the ACL events for a domain name. You can select the domain name and query time to view the corresponding records.

Note:

For more information about the HTTP ACL events, see *HTTP ACL events*.



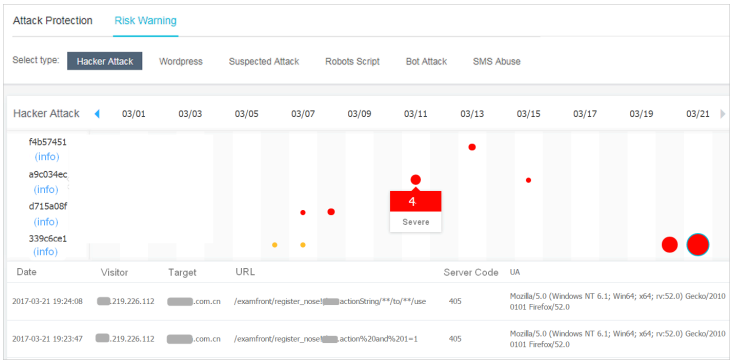
- View risk warning report

  On the Risk Warning tab page, select a risk type to view details. You can view the following risk records:

  - Hacker attack

    Risk warning provides the hacker profiling function based on Alibaba Cloud big data analytics and the attack source tracing capability. This function identifies and records the malicious behaviors and activities of recognized hackers on your website. These behaviors include footprints, scans, and attacks. A hacker can be an individual or it can be a group of hackers, with

real identities. When you receive such alarms, it means your website is hacked by a known hacker.



Dots in the figure indicate the activity of hackers on the corresponding date. Click a specific dot to view the detailed attack record. Here,

- Different lines stand for different hackers. Click hacker information to view the characteristics of the hacker.
- The severity of the hazard is gauged by the color of the dot. Darker the color, more severe is the hazard.
- The size of the dots indicates the frequency of attacks during the day. Bigger dots indicate more attacks and smaller dots, lesser attacks.

Defense: The attack displayed in the report is intercepted by WAF. You do not need to worry about it. We recommend that you pay attention to non-web services security on the server because the hackers may try various options (for example, SSH and database port) to penetrate into your website.

- Wordpress

  Risk warning detects WordPress attacks according to attack features described in *Prevent WordPress bounce attacks*. If the number of such warnings keeps increasing, your server may encounter this kind of HTTP Flood attacks these days.

  Defense: Configure *HTTP flood protection* according to the defense suggestions provided in the preceding document.

- Suspected attack

  Based on the exception detection algorithm of big data analytics, WAF screens suspicious access requests, which may include abnormal parameter names,

types, sequences, special symbols, and statements, for you to perform further analysis and provide protection based on service features.

The risk warnings highlight the abnormal portion. For example, the request shown in the following figure includes two repeated parameters and is not connected with the conventional “&” symbol.

Defense: The alarm here reports a suspicious request, which may be a normal request of a special service or a variant attack. Analyze the alarm based on features of your service.

- Robot Script

  WAF supports detecting features of common machine script tools, such as Python2.2 and HttpClient. If you have not submitted a large number of requests through the test tool recently, the alarm number indicates the number of malicious requests received or detected from some machine script tools. It may also include the tools used to test the traffic pressure or initiate HTTP flood attacks.

  Defense: Check whether HTTP flood attacks exist by analyzing *logs* and intercept malicious attacks based on protection algorithms such as *HTTP ACL Policy*, *HTTP flood protection emergency mode*, and *blocked region*.

- Bot Attack

  WAF supports detecting crawler requests (including valid crawlers such as Baidu spider). If the number of this alarms is high, the number of requests increases abnormally on the server, and the CPU usage increases, the website may encounter malicious crawler requests or HTTP flood attacks that are masqueraded as crawlers.

  Defense: Based on logs and server performance analysis, check whether HTTP flood attacks or malicious crawler requests exist. For more

information, see *Intercept malicious crawlers*. WAF does not incept valid crawler (for example, Baidu crawler) requests.

- SMS Abuse

  WAF supports detecting requests on interfaces such as the short message registration interface and short message verification interface. If you receive more alarms, your short message interface is being abused (causing high short message overhead).

  Defense: Click View Details to view specific requests. You can analyze whether the invocation is normal service invocation based on the source IP address and interface to which most requests are sent. If not, we recommend that you use *Data Risk Control* and *Custom HTTP flood protection* to protect the abused interfaces.

5.3 Log search

When the Log search feature is enabled, Alibaba Cloud WAF helps you record all web requests to your website and enables you to search the stored logs for business analysis or security management.

Context

You must upgrade Alibaba Cloud WAF Pro to the Business or Enterprise plan to use this feature. For more information, see *Renewal and upgrade*.

Note:
The international WAF instance must be upgraded to the Enterprise edition to use this feature.

With the log search function, you can easily complete the following O&M tasks:

- Check the action (block or allow) WAF performs on a specific request.
- Check the type of rule that terminated a request: web attack protection rule, HTTP flood attack protection rule, or custom access control rule.
- Check the response time of a specific request to see if the origin server response timed out.
- Use a combination of field filtering conditions to search for specific requests. For example, source IP address, URL keyword, cookie, referer, user-agent, X-forwarded-for, server response status code, and more.

> **Note:**
> When you enable the Log search function, this constitutes your permission for Alibaba Cloud to record all of the web requests that are inspected by WAF (POST data is not recorded).

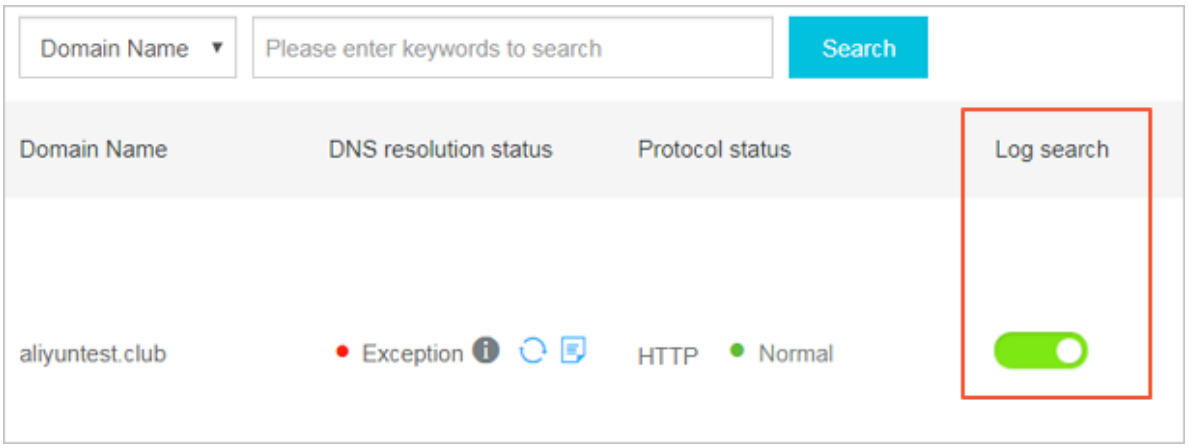
As a prerequisite, you must go to the Website Configuration page to enable the log search function for a specific domain name. Alibaba Cloud WAF starts recording request logs for the website only when the Log search switch is on. When Log search is enabled, you can go to the Logs page to search for logs of the domain name.

> **Note:**
> You can view the request log for up to 100 domain names.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. Go to the Management > Website Configuration page and select the region of your WAF instance (Mainland China or International).
3. Select the domain name to be configured and enable Log search for it.

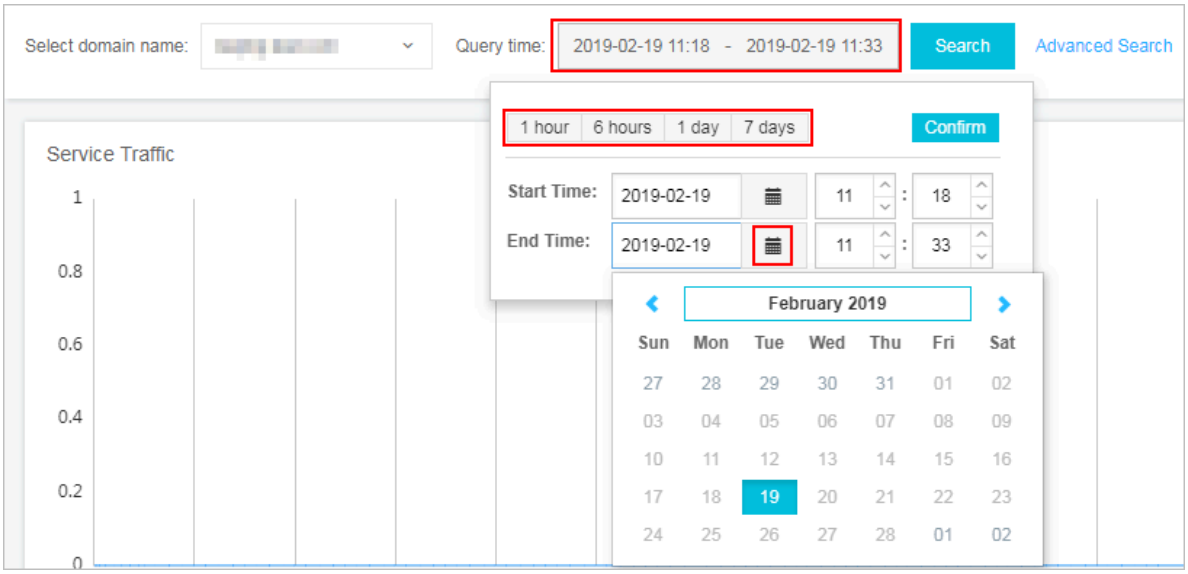
   > **Note:**
   > You can also disable Log search on this page. When Log search is disabled, the request log is no longer recorded. Even if you enable Log search again, you cannot query the request log for the time during which the function is disabled.

4. Go to the Reports > Logs page.

5. Select the domain name, Query time and click Search.

> **Note:**
> Only the latest 30 days' logs can be accessed.



You can also click Advanced Search to define more detailed search conditions.

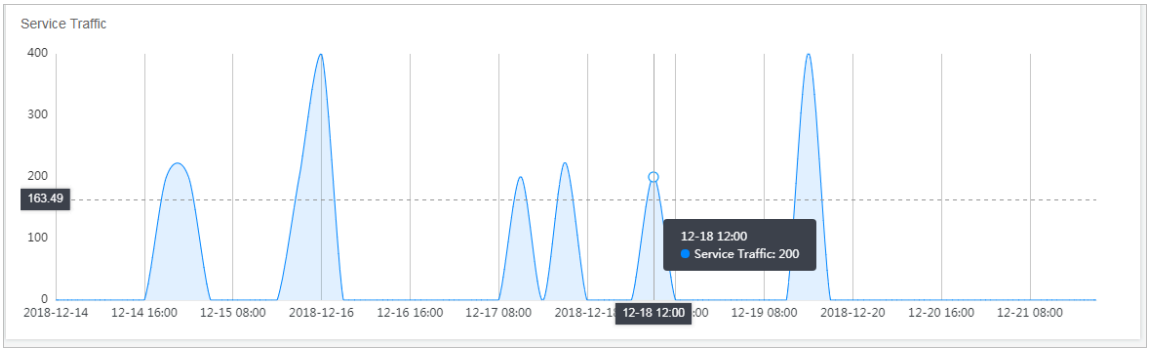
Table 5-1: Advanced search fields

Field	Description
Source IP	The source IP address.
URL Key Words	The requested URL. **Note:** This field supports the "/" symbol. For example, you can enter `/NTIS/casier`.
Cookie	The client-side cookie, which is included in the request header.
Referer	The referer field in the HTTP request header.
User-Agent	The user agent string in the request that identifies the client browser, operating system, and more.
X-Forwarded-For	The XFF field in the request header.

Field	Description
Server Response Code	The response status code that Alibaba Cloud WAF received from the origin server. Note: A three-digit number is supported. You can also specify the -symbol to search for requests that have no response status information. For example, the request was blocked.
Status Code Returned by WAF	The response status code that Alibaba Cloud WAF returned to the client. Note: A three-digit number is supported. You can also specify the -symbol to search for requests that have no response status information. For example, the request was blocked.
Request Unique ID	The request ID. If the request was blocked, you can find the request ID in the blocking page.
Request Domain	When a wildcard domain name is enabled with the log search function, you can use this field to search for a specific domain name.
Protection policies	You can use this option to specify the rule matching type, which includes Web Application Attack Protection, HTTP Flood Protection Policies, HTTP ACL Rules, Region Blocking, and Data Risk Control.

6. View the search result.

   · In the Service Traffic area, you can view access request volume trend charts for the search time range.



   · In the Request Logs list, you can view the access request records that match the search conditions. The following figure shows the log for an access request that was blocked against the HTTP flood attack protection rule.

   Descriptions of parameters in the Origin’s response info

   - Status: indicates the response status information that Alibaba Cloud WAF returns to the client.
   - Upstream_status: indicates the response status information that Alibaba Cloud WAF received from the origin server. If “-“ is returned, this indicates no response. For example, this request was blocked by Alibaba Cloud WAF or the origin server response timed out.
   - Upstream_ip: indicates the origin site IP address of this request. For example, when Alibaba Cloud WAF returns traffic back to an ECS instance, this parameter returns the IP address of the origin ECS instance.
   - Upstream_time: indicates the time the origin server took to respond to the WAF request. “-“ indicates the response timed out.

7. Click Log download in the upper-right corner of the Log query page to add a download task for the currently retrieved log. On the View the downloaded file page, you can download the log file to your local client.

   Note:

You can download up to 20 million lines of logs at a time. If you want to export more than 20 million lines of logs, we recommend that you perform multiple download tasks.

Description of request log fields

Field	Name	Description
Time	Time	The UTC time of the request.
Domain	Domain	The requested domain name.
Source_IP	Source IP	The source IP address.
IP_City	IP City	The city from which the request originated.
IP_Country	IP Country	The country from which the request originated.
Method	Method	The HTTP method of the request.
URL	Access request URL	The requested URL.
Https	Access Request Protocol	The protocol specified in the request.
Referer	Referer	The referer field in the HTTP header.
User-Agent	User Agent	The user agent string in the request that identifies the client browser, operating system, and more.
X-Forwarded-For	X-Forwarded-For	The x-forward-field in the request header that identifies the originating IP address of a client connecting to a web server through an HTTP proxy or load balancer.
Cookie	Cookie	The cookie field in the request header that identifies the client cookie information.

Field	Name	Description
Attack_Type	Attack Type	The event triggered by the request. · 0: indicates that no attack was found. · 1: indicates that the Web application attack protection rule was triggered. · 2: indicates that the HTTP flood protection rule was triggered. · 3: indicates that the HTTP ACL policy rule was triggered. · 4: indicates that the Blocked region rule was triggered. · 5: indicates that the Data risk control rule was triggered.
Status	Response Status Code	The response status code that Alibaba Cloud WAF returned to the client.
Upstream_status	Status	The response status code that Alibaba Cloud WAF received from the origin site. "-" indicates that no response was received. For example, the request was blocked by WAF or the origin site timed out.
Upstream_IP	Upstream IP	The source IP address of the request. For example, when Alibaba Cloud WAF returns traffic to an ECS instance, this parameter indicates the IP address of the origin ECS instance.
Upstream_Time	Upstream Time	The time that the origin server took to respond to the request. "-" indicates that the response timed out.

5.4 Data visualization

Based on the detailed website logs collected by WAF, WAF provides the data visualization service. By converting the data into a visual big screen, you can monitor and understand the real-time attack and defense situations of your website. This provides you with visual and transparent data analysis and decision-making capabilities to keep your website security.

Features

Currently, the WAF data visualization service provides the following two visual screens for your choice:

Note:
More WAF data visualization screens are coming.

Note:
Because of the particularity of visual screens, only Google Chrome browser 56 and a later version is supported.

WAF Real-time Attack and Defense Situation Screen

WAF real-time attack and defense situation screen is updated every second. It displays current day's website visit and overall interception situations for all your websites that protected by WAF. This screen focus on displaying the stability of the website service and the quality of the network service.

Note:
The data range on this screen is from 0:00 to the current time of today.

Display item	Description
Inbound Bandwidth	Inbound bandwidth traffic (Unit: bps).
Outbound Bandwidth	Outbound bandwidth traffic (Unit: bps).
QPS	Current website traffic (Unit: QPS).
Interception Ratio	The percentage of the website requests that are intercepted by WAF.
Today's Interceptions	The number of the website requests that are intercepted by WAF.
Mobile OS Distribution	OS distribution for the visit requests from mobile clients.
PC Browser Distribution	Browser distribution for the visit requests from PC clients.
Top 10 Source IPs	The top 10 source IPs that have most visits and their visit volumes.
Top 5 Visited URLs	The top 5 URLs that is visited and their visit volumes.

Display item	Description
Exception Monitoring	The exception HTTP response status code returned and their occurrences.
Visit Statistics (Mainland China)	The visit statistics heat map shows the source distribution of the visit requests in the last hour.
Request	Shows the visit request trending (Unit: QPS). Additionally, this chart shows the trend in the number of requests intercepted by WAF, including precise access control interception, anti -fraud interception, web attack interception and HTTP flood attack interception.
Bandwidth	Shows the inbound and outbound bandwidth trending (Unit: bps).

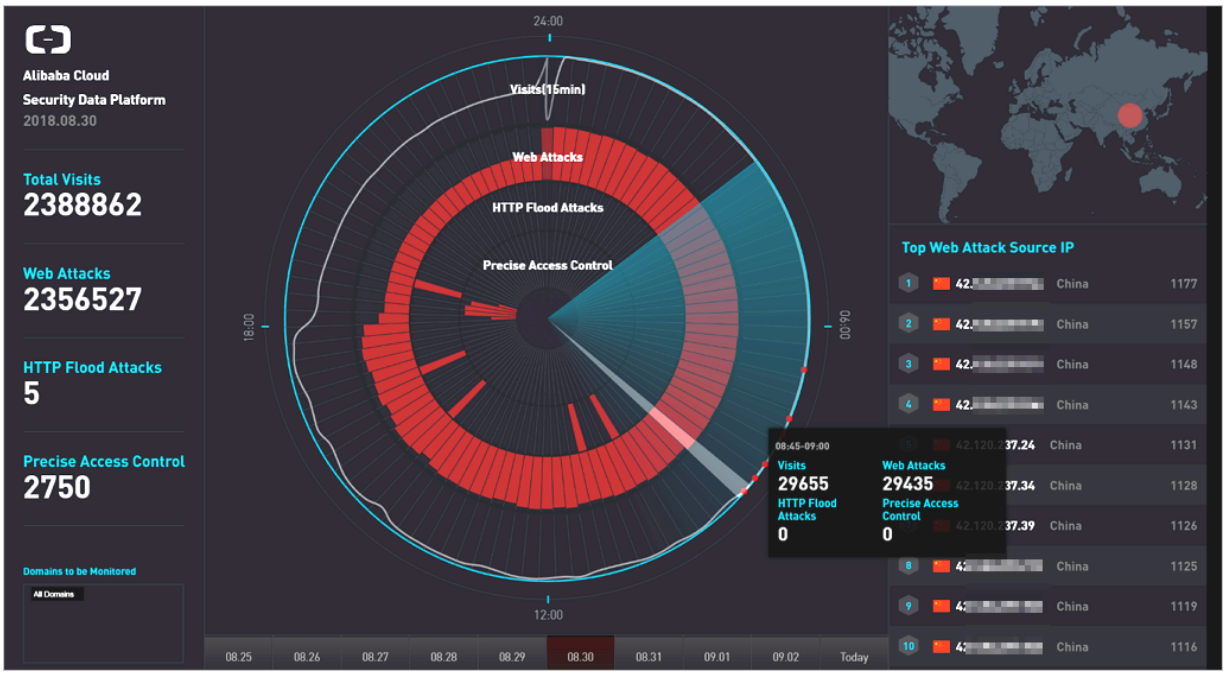
The white points on the earth in the middle of the screen show the global WAF server room.

WAF Security Data Platform Screen

WAF security data platform screen displays security information about web attacks, HTTP flood attack, and precise access control interceptions.

> Note:
> By clicking the Domains to be Monitored area at the lower-left corner of the screen, you can choose the domains that you want to monitor. You can also choose to monitor all the domains.

Display item	Description
Total Visits	The number of total visits of the selected domains on the day.
Web Attacks	The number of web attacks intercepted by WAF for the selected domains on the day.
HTTP Flood Attacks	The number of HTTP flood attacks intercepted by WAF for the selected domains on the day.
Precise Access Control	The number of requests intercepted by the WAF precise access control rules for the selected domains on the day.
Top Web Attack Source IP	Top attack source IPs, the region of the IPs, and their attack volumes. Additionally, hover the mouse over the top attack source IP to view the web attack type distribution and the tags of the source IP.
Regional heat map	The regional heat map on the upper-right corner shows the distribution of the regions that the attack source belongs to.



The radar chart in the middle of the WAF security data platform screen shows the visits, web attack interception, HTTP flood attack interception, and precise access control interceptions every 15 minutes as an interval. Additionally, you can select a time period in the radar chart, and click the floating window, to view detailed security data information for that time period.

Note:

Click the date at the bottom of the large screen to select to display the security data for the specified date.

Display item	Description
Visits	Website visits (Unit: QPS).
Web Attacks	The number of web attacks intercepted by WAF.
HTTP Flood Attacks	The number of HTTP flood attacks intercepted by WAF.
Precise Access Control	The number of requests intercepted by precise access control rules in WAF.
Top Web Attack Source IP	Top attack source IPs, the region of the IPs, and their attack volumes. Additionally, hover the mouse over the top attack source IP to view the web attack type distribution and the tags of the source IP.
Web Attack Types	The distribution of web attack types intercepted.
Top Attack Regions	The top 5 attack source regions.
Top Hit Rules	The top 5 WAF protection rules that were hit.

Enable the Data Visualization service

To enable the Data Visualization service, follow these steps:

1. Log on to the *Alibaba Cloud Security WAF management console*.
2. Go to Reports > Data Visualization, select the region of your WAF instance, and click Purchase Now。

> Note:

If the region of your WAF instance is International, you must upgrade it to the Business or Enterprise version.

3. On the WAF instance upgrade page, select Single Screen or Multiple Screens.

Options	Description	Pricing
Single Screen	Only one data visualization screen is supported.	USD 300/month
Multiple Screen	All WAF data visualization screens are supported.	USD 600/month

Note:
The Data Visualization service inherits the expiration time of your current WAF instance. According to the service option you selected and the expiration time of the current WAF instance, the system automatically calculates the payment for you. After you enable the Data Visualization service, you have to renew the Data Visualization service when you renew your WAF instance.

4. Click to select the Web Application Firewall Service of Terms, and click Pay.
5. On the Data Visualizationpage, click one data visualization screen to enjoy the WAF Data Visualization service.

Note:
If you purchased the Single Screen service, select one data visualization screen, and click Enable Now.

6 Setting

6.1 View product information

The Product Information page of Alibaba Cloud WAF provides you with an intuitive view over your subscription details, the built-in protection rule updates, feature changes, and WAF’ s IP addresses.

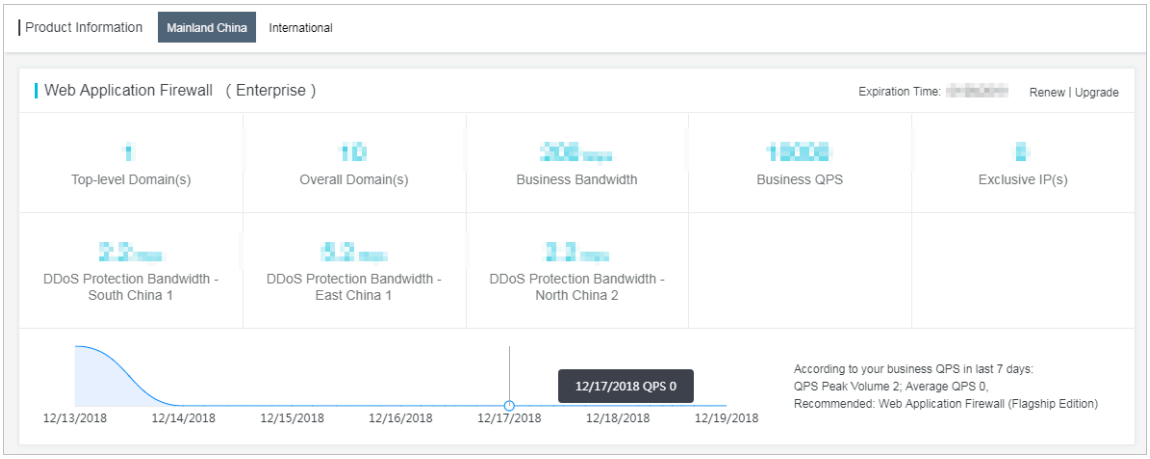
Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.

3. Go to the Setting > Product Information page to view the following information.

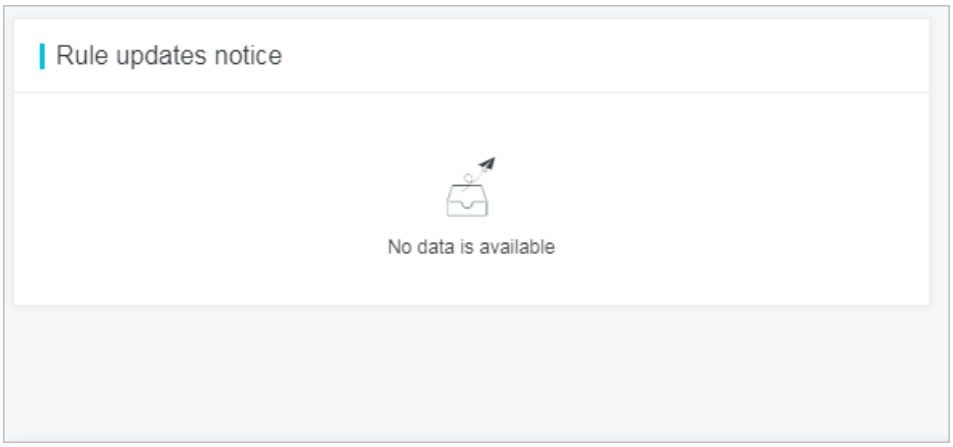
   · Subscription details

   - The current subscription plan and expiration time (Renew and Upgrade are supported)
   - The maximum number of Top-level Domain(s) can be configured
   - The maximum number of Overall Domains can be configured
   - The maximum Business Bandwidth of all accessed domains
   - The maximum Business QPS of all accessed domains
   - The number of Exclusive IP(s)
   - The extra DDoS Protection Bandwidth (by region)
   - The business QPS graph of the latest 7 days



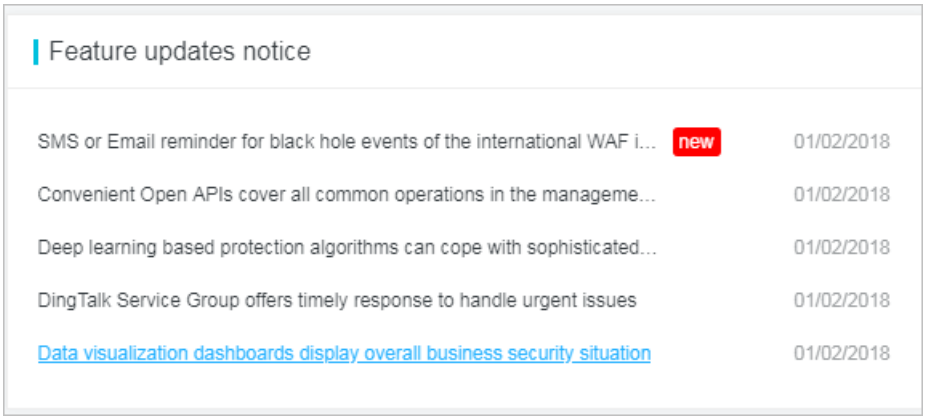
   · Rule Updates Notice

   Informs you about the latest updates of the built-in protection rules of Alibaba Cloud WAF. View details by clicking a title.



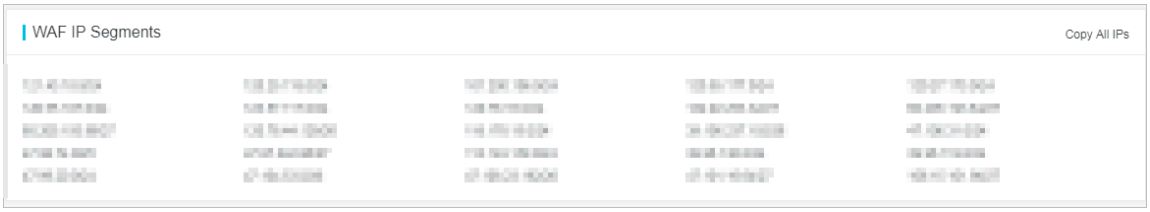
   · Feature Updates Notice

Informs you about the latest change in the Alibaba Cloud WAF feature.



- WAF IP Segments

  Lists all Alibaba Cloud WAF IP addresses. Click Copy All IPs to copy them to the clipboard.



6.2 Custom rule groups

A rule group is a combination of the built-in protection rules of Alibaba Cloud WAF that makes up an optional policy for a specific protection function. You can create and apply a custom rule group for a specific protection function of WAF to achieve dedicated protection effect.

> **Note:**
> Custom rule group is included in the Business or Enterprise subscription plan. Currently, this feature only applies to Web application protection. For more information about the default protection policy of Web application protection, see *Web application protection*.

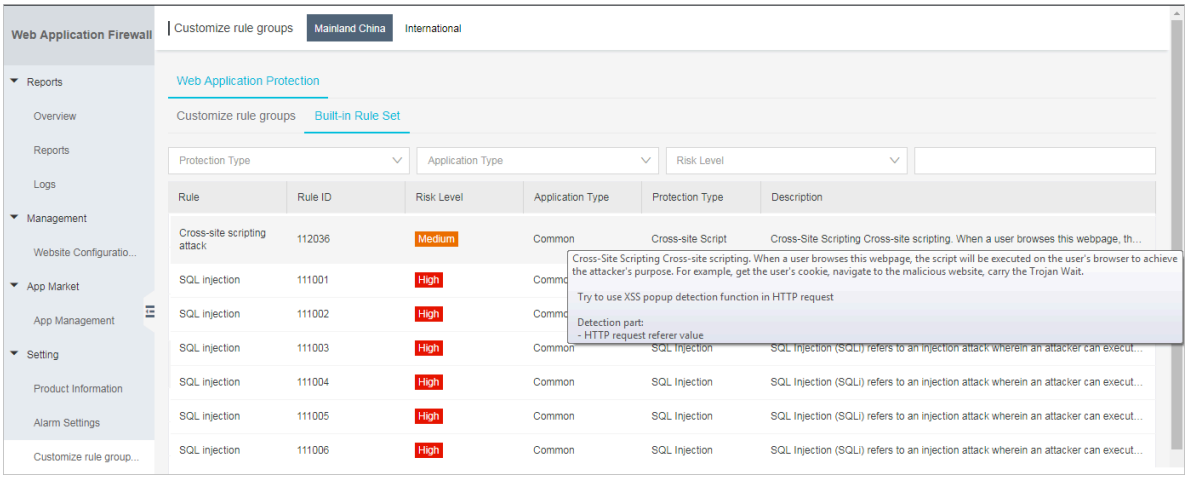
View the build-in protection rules

Before you create a custom rule group, we recommend that you get yourself familiar with the build-in protection rules of Alibaba Cloud WAF.

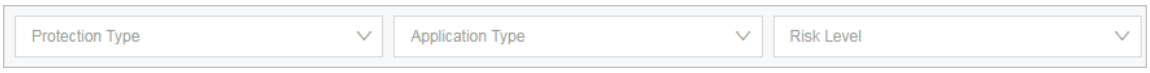
Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.
3. On the Setting > Customize Rule Groups page, select the protection function to view. Currently, only Web Application Protection is supported.
4. Click the Built-in Rule Set page tab to view the protection rules of Web application protection. Each rule consists of the following information:
   - Rule: The name of this rule.
   - Rule ID: The unique identifier of this rule.
   - Risk Level: The risk level of the vulnerability that is defended against by this rule.
   - Application Type: The application that is protected by this rule. Options: Common, Wordpress, Discuz, Tomcat, phpMyAdmin, and more.
   - Protection Type: The type of the web attack that is defended against. Options: SQL Injection, Cross-site Script, Code Execution, CRLF, Local File Inclusion, Remote File Inclusion, Webshell, CSRF, and Others.
   - Description: The description of this rule, including web attack description, code to inspect, and on which selector to run the inspection.

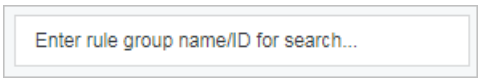
> **Note:**
> You can view the detailed description of a rule by placing the pointer on a description.



5. (Optional) Use filters and search to locate to a specific rule.
   - You can filter rules by protection type, application type, and risk level.

   - You can search for rules by rule name or ID.

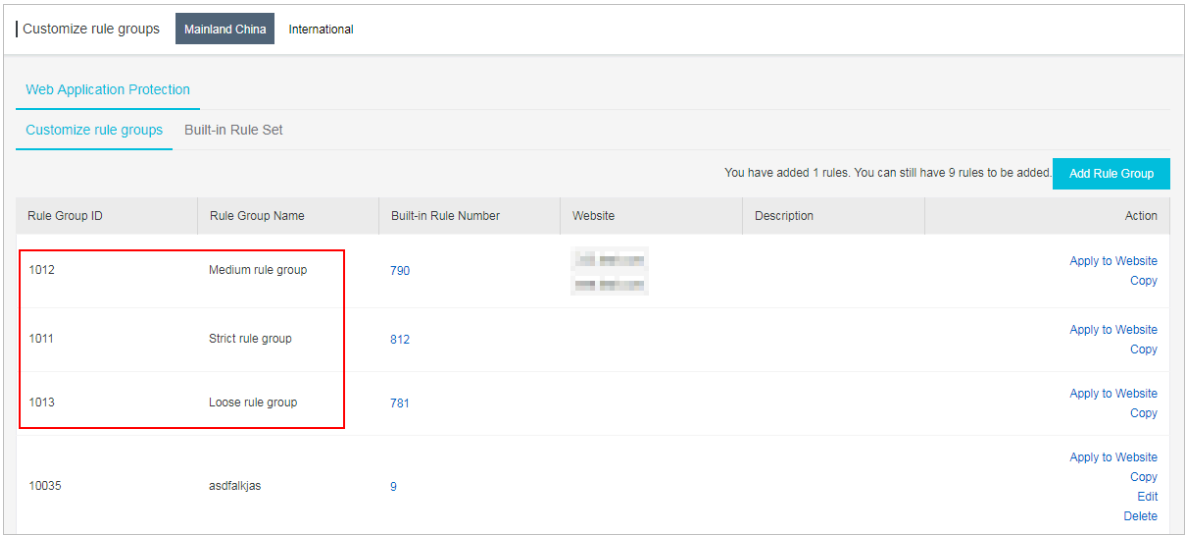
Add a custom rule group

You can create a custom rule group for a specific protection function (only Web Application Protection is supported now). When you are creating a custom rule group , you select built-in rules to add to the group to compose a dedicated protection policy .

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.
3. On the Setting > Customize Rule Groups page, select the protection function to be operated. Currently, only Web Application Protection is supported.

   The Customize Rule Groups page displays all rule groups of Web Application Protection, among which the rule group IDs of 1011, 1012, and 1013 are the default rule groups.

4. Add a custom rule group by creating one or coping an existing one.

   Note:

You can add up to 10 custom rule groups for Web Application Protection.

- Create a custom rule group

  a. Click Add Rule Group.

  b. On the Add Rule Group page, complete the following configuration.

  - Rule Group Name: Required. Name this rule group. We recommend that you use a name with an indicative meaning, because this name will display in the drop down box for you to select a protection policy.
  - Description: Optional. Add a description for this rule group.
  - Rules: Select rules from the left-side area of all built-in rules to add to the right-side area of this rule group’ s rules.

    For more information about rules, see *Step 4 of View the built-in rules*. You can locate to a specific rule by using filters and search. For more information, see *Step 5 of View the built-in rules*.

  c. Click Confirm to add the rule group.

  The newly created rule group is assigned with a rule group ID.

- Copy an existing rule group

  a. Locate to the rule group to be copied and click Copy.

  b. On the Add Rule Group page, enter a new name in Rule Group Name, and confirm the inherited rules. (You cannot add or delete rules in this step.)

  c. Click Confirm to add the rule group.

  The newly copied rule group is assigned with a rule group ID. See *Edit a custom rule group* to add or delete rules in this rule group.

Apply a custom rule group to websites

When a rule group is added, you can enable it in the protection Policies of a specific website or enable it for bulk domains in the Customize Rule Groups page.

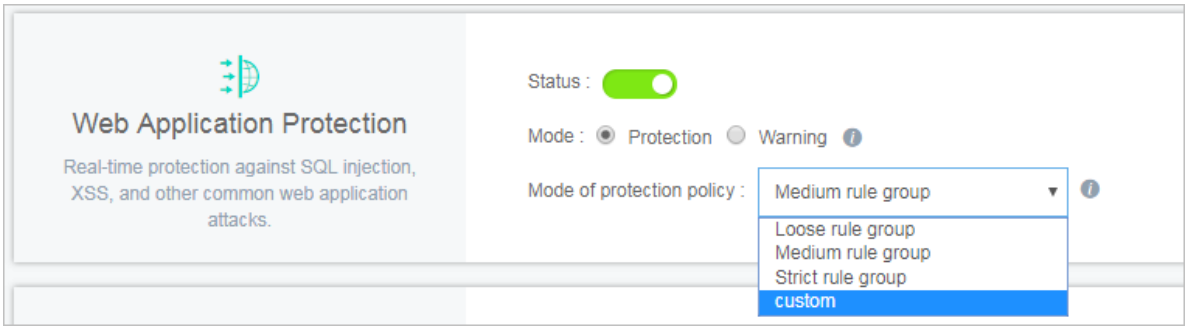
Procedure

Taking Web Application Protection as an example, you can follow these steps to enable or disable a custom rule group in website configuration.

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.

3. On the Management > Website Configuration page, select the domain name to be configured and click Policies.
4. Under Web Application Protection, enable the protection.
5. Expand the Mode of protection policies drop down box, and select the newly added rule group by name. (In this example, select custom.)

   To disable a custom rule group, you select a default policy in the Mode of protecting policy drop down box. In this example, select Strict rule group, Medium rule group, or Loose rule group.



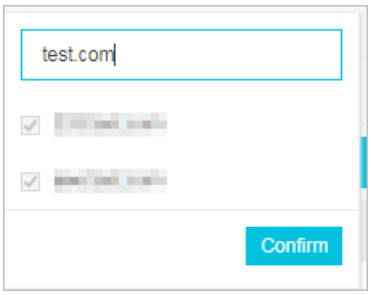
Taking Web Application Protection as an example, follow these steps to apply a custom rule group to bulk domains:

Note:
To disable a rule group, we recommend that you go to the protection Polices page of the specific domain.

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.
3. On the Setting > Customize Rule Groups page, select the protection function to be operated. Currently, only Web Application Protection is supported.
4. On the Customize Rule Groups tab page, locate to the rule group to be operated, and click Apply to Website.

5. Check the website to apply the specified rule group and click Confirm.

   You can search for domains.



Edit a custom rule group

When a custom rule group is successfully added, you can edit it to manage the rules or change its name and description. The default rule group cannot be edited.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.
3. On the Setting > Customize Rule Groups page, select the protection function to be operated. Currently, only Web Application Protection is supported.
4. Locate to the rule group to be operated, and click Edit.
5. On the Edit Rule Group page, re-configure the rule group. For more information, see *Add a custom rule group*.
6. Click Confirm to update the rule group.

Delete a custom rule group

For an unnecessary custom rule group, you can delete it. Before deleting a rule group , you must make sure that the rule group has not been applied to any website. The default rule group cannot be deleted.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.
3. On the Setting > Customize Rule Groups page, select the protection function to be operated. Currently, only Web Application Protection is supported.
4. Locate to the rule group to be deleted, and click Delete.

5. In the Tips dialog box, click Confirm.

> Note:
> If the group has been applied to websites, you must disable it from the website configuration to continue the deletion. For more information, see *Apply a custom rule group to websites*.

6.3 Configure alarm settings

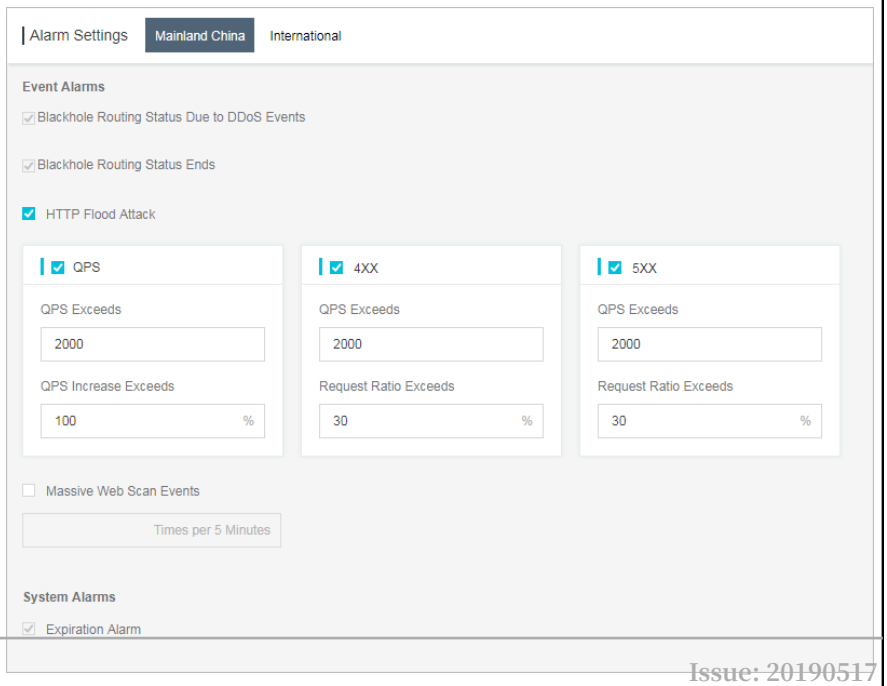
Context

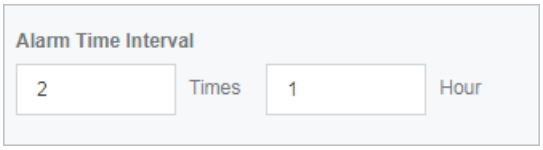
Alibaba Cloud WAF informs you about security events and system events through emails. You can configure the alarm triggering condition and alarm time interval.

Procedure

1. Log on to the *Alibaba Cloud WAF console*.
2. On the top of the page, select the region: Mainland China or International.

3. **On the Setting > Alarm Settings page, complete the following configuration.**

Configuration	Description
Triggered by	Specify which security or system event can trigger an alarm. Note: The default alarm cannot be disabled or configured. · Event Alarms - Blackhole Routing Status Due to DDoS Events (default) - Blackhole Routing Status Ends (default) - HTTP Flood Attack You must specify the conditions that trigger the alarm. ■ QPS exceeds a predefined maximum value (1 to 10,000,000) and increases by a predefined maximum rate (0% to 1,000%). ■ 4xx requests exceed a predefined maximum QPS (1 to 10,000,000) and occupy a predefined maximum proportion (0% to 1,000%). ■ 5xx requests exceed a predefined maximum QPS (1 to 10,000,000) and occupy a predefined maximum proportion (0% to 1,000%). - Massive Web Scan Events You must specify the maximum frequency per 5 minutes. · System Alarms: Expiration Alarm (default) 

Configuration	Description
Alarm Time Interval	Repeat alarms for xx (0 to 10) times per xx (0 to 24 hours). 

4. Click Save Settings.

6.4 Release WAF instance

Context

When the WAF instance expires, you can release it.

Note:
Before you release a WAF instance, make sure that all protected domain names are resolved to the origin sites instead of the WAF instance. Once the instance is released, all website configurations are cleared. If any request still reaches the WAF instance, it cannot be forwarded.

Procedure

1. Log on to the *Alibaba Cloud WAF console*, and select the region.
2. In the upper-right corner of the page, click Close WAF.

   Note:
   This button appears only when the WAF instance expires.
3. Confirm that all protected domain names are resolved to the origin sites, and click OK to release the WAF instance.

7 Real-time log query and analysis

7.1 Real-time log analysis

Integrated with Log Service, WAF provides access logs and attack logs, and allows you to analyze logs in real time.

The real-time log analysis feature in WAF collects and stores access logs in real time and provides the following capabilities based on Log Service: log querying, analysis, reporting, alerting, forwarding, and computing. The service makes it easy to search log data so that you can focus on log analysis.

Target users

- Large enterprises and institutions that need to meet compliance requirements regarding the use of cloud hosts, networks, and the storage of security logs, such as financial companies and government agencies.
- Enterprises that have private security operations centers (SOCs) and need to collect security logs for centralized operations and management, such as large real estate , e-commence, financial companies, and government agencies.
- Enterprises that have strong technical capabilities and need to perform in-depth analysis on logs of cloud resources, such as IT, gaming, and financial companies.
- Small and medium-sized enterprises and institutions that need to meet compliance requirements regarding their business on the cloud or need to generate business reports on a regular basis, such as monthly, quarterly, and annual reports.

Benefits

- Compliance: Stores the website's access logs for more than six months to help the website meet the compliance requirements.
- Simple configuration: You can easily configure the service to collect access logs and attack logs on your site.
- Real-time analysis: Integrated with Log Service, the service supports real-time log analysis and offers a ready-to-use report center. You can easily gain information about the details of attacks, and visits to your site.
- Real-time alarms: Near real-time monitoring and custom alarms based on specific metrics are available to ensure a timely response to critical service failures.

- Collaboration: The service can be integrated with real-time computing, cloud storage, visualization, and other data solutions to help you gain valuable insights into your data.

Prerequisites and limits

To use the real-time analysis feature in WAF, you must meet the following prerequisites:

- You have activated *Log Service*.
- You have activated *WAF Enterprise Edition* and enabled the log analysis module.

All log data in WAF is stored in an exclusive logstore that has the following limits:

- Users cannot use APIs or SDKs to write data to the logstore or change attributes of the logstore, such as the storage period.

  Note:
  The logstore supports common features, including log querying, reporting, alerting, and stream computing.
- The logstore is free of charge on condition that Log Service is available and your account has no overdue payments.
- The system reports may be updated at irregular intervals.

Scenarios

- Analyze log data to track attacks and identify threats.
- Monitor Web requests in real time to predict traffic trends.
- Quickly learn about the efficiency of security operations and obtain timely feedback.
- Transfer network logs to user-created data centers or computing centers.

7.2 Billing method

Web Application Firewall (WAF) Log Service is billed based on the log storage period and the log storage size of your choice.

WAF Log Service is activated on a subscription basis.

Note:
To activate WAF Log Service, you must buy a WAF subscription.

In the WAF purchase page, enable Activate Log Service and select the log storage period and the log storage size. Then, the price is automatically calculated based on the log store specification of your choice and the validity of the WAF instance.

Log storage specification

The detailed pricing for each log storage specification for WAF Log Service is shown in the following table.

Log storage period	Log storage size	Recommended scenarios	For International region instances		For Mainland China region instances	
			Monthly subscription	Yearly subscription	Monthly subscription	Yearly subscription
180 days	3 TB	Average daily QPS is up to 80.	USD 450	USD 5,400	USD 225	USD 2,700
	5 TB	Average daily QPS is up to 120.	USD 750	USD 9,000	USD 375	USD 4,500
	10 TB	Average daily QPS is up to 260.	USD 1,500	USD 18,000	USD 750	USD 9,000
	20 TB	Average daily QPS is up to 500.	USD 3,000	USD 36,000	USD 1,500	USD 18,000
	50 TB	Average daily QPS is up to 1,200.	USD 7,500	USD 90,000	USD 3,000	USD 36,000
	100 TB	Average daily QPS is up to 2,600.	USD 15,000	USD 180,000	USD 7,500	USD 90,000
360 days	5 TB	Average daily QPS is up to 60.	USD 750	USD 9,000	USD 375	USD 4,500
	10 TB	Average daily QPS is up to 120.	USD 1,500	USD 18,000	USD 750	USD 9,000
	20 TB	Average daily QPS is up to 260.	USD 3,000	USD 36,000	USD 1,500	USD 18,000

Log storage period	Log storage size	Recommended scenarios	For International region instances		For Mainland China region instances	
			Monthly subscription	Yearly subscription	Monthly subscription	Yearly subscription
	50 TB	Average daily QPS is up to 600.	USD 7,500	USD 90,000	USD 3,000	USD 36,000
	100 TB	Average daily QPS is up to 1,200.	USD 15,000	USD 180,000	USD 7,500	USD 90,000

Upgrade storage capacity

If you have no log storage left, a notification appears to remind you to expand the storage size. You can expand the log storage size at any time.

Notice:
If log storage is full, WAF stops writing new log entries to the exclusive logstore in Log Service. A log entry stored in the logstore is deleted based on the specified period. If the WAF Log Service instance expires and you do not renew it within seven days, all log entries in the logstore are deleted.

Validity

The validity of the WAF Log Service instance is based on your WAF subscription.

- Buy: When you buy a WAF subscription and enable Log Service, the price of Log Service is calculated based on the validity of the subscription.
- Upgrade: When you enable Log Service by upgrading an existing WAF subscription, the price of Log Service is calculated based on the remaining validity of the existing WAF instance. The remaining validity is accurate to minutes.

Service expiration

If your WAF instance expires, WAF Log Service expires at the same time.

- When the service expires, WAF stops writing log entries to the exclusive logstore in Log Service.

- The log entries recorded by WAF Log Service are retained within seven days after the service expires. If you renew the service within seven days after the service expires, you can continue to use WAF Log Service. Otherwise, all stored WAF log entries are deleted.

7.3 Activate WAF Log Service

After purchasing a Web Application Firewall instance, you can activate the real-time log query and analysis service for your websites on the App Management page in the console.

Scope

With WAF Log Service, you can collect multiple log entries in real time from your websites that are protected by WAF. You can also perform real-time log query and analysis and display results in dashboards. WAF Log Service fully meets the business protection needs and operational requirements of your websites. You can select the log storage period and the log storage size as needed when enabling WAF Log Service.

Note:
At the moment, WAF Log Service is only available to WAF subscription instances (Pro, Business, or Enterprise edition).

Enable WAF Log Service

1. Log on to the *Web Application Firewall console*.
2. Choose App Market > App Management, and select the region where your WAF instance is located.
3. Click Upgrade in Real-time Log Query and Analysis Service.
4. On the page that is displayed, enable Log Service, select the log storage period and the log storage size, and then click Buy Now.

   Note:
   For more information about the billing of WAF Log Service, see *WAF Log Service Billing methods*.
5. Return to the WAF console and choose App Market > App Management, and then click Authorize in Real-time Log Query and Analysis Service.

6. Click Agree to authorize WAF to write log entries to your exclusive logstore.

   WAF Log Service is then enabled and authorized.
7. Return to the WAF console and choose App Market > App Management and then, click Configure in Real-time Log Query and Analysis Service.
8. On the Log Service page, select the domain name of your website that is protected by WAF, and turn on the Status switch on the right to enable WAF Log Service.

   Log Service collects all web log recorded by WAF in real time. These log entries can be queried and analyzed in real time.

7.4 Log collection

You can enable the Web Application Firewall (WAF) log collection feature for a specified domain in the WAF console.

Prerequisites

- Buy a WAF instance and protect the *domain using WAF*.
- Enable Log Service.

Context

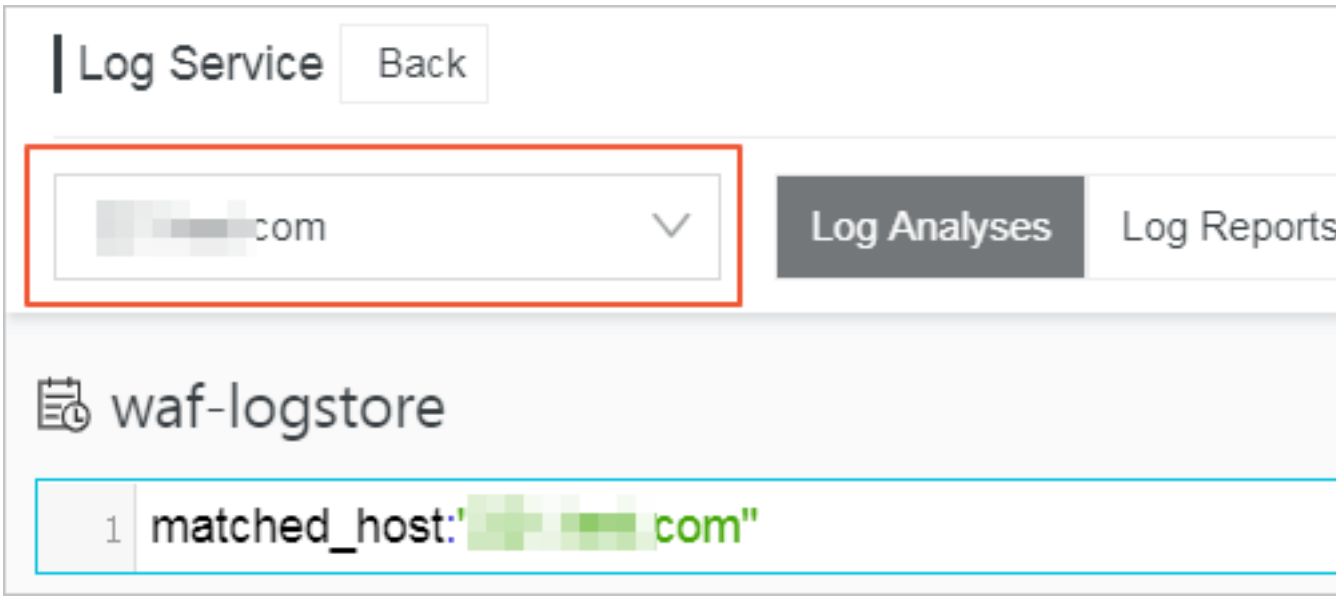
Log Service collects log entries that record visits to and attacks on websites that are protected by Alibaba Cloud WAF, and supports real-time log query and analysis. The query results are displayed in dashboards. You can timely perform analytical investigation on visits to and attacks on your websites and help security engineers to develop protection strategies.

Procedure

1. Log on to the *Web Application Firewall console*.
2. Choose App Market > App Management, and click Real-time Log Query and Analysis Service.

   Note:
   If you are configuring the WAF log collection feature for the first time, click Authorize and follow the instructions on the authorization page to authorize WAF to write all log entries to your exclusive logstore.

3. Select the domain and turn on the Status switch on the right to enable the log collection feature.



The WAF log collection feature has now been enabled for the domain. Log Service automatically creates an exclusive logstore for your account. WAF automatically writes log entries to the exclusive logstore. The following *Default configuration* table describes the default configuration of the exclusive logstore.

Table 7-1: Default configuration

Default configuration item	Description
Project	A project is created by default. The project name format is determined by the region of your WAF instance. · If the WAF instance is created in Mainland China, the project name is `waf-project-Your Alibaba Cloud account ID-cn-hangzhou`. · If the WAF instance is created in other regions, the project name is `waf-project-Your Alibaba Cloud account ID-ap-southeast-1`.
Logstore	A logstore `waf - logstore` is created by default. All log entries collected by the WAF log collection feature are saved in this logstore.

Default configuration item	Description
Region	· If the WAF instance is created in Mainland China , the project is saved in the Hangzhou region by default. · If the WAF instance is created in other regions, the project is saved in the Singapore region by default.
Shard	Two shards are created by default with the *Automatic shard splitting* feature enabled.
Dashboard	Three dashboards are created: · Access Center · Operation Center · Security Center For more information about dashboards, see *WAF Log Service—Log Reports*.

Limits and instructions

· Other data cannot be written to the exclusive logstore.

  Log entries generated by WAF are stored in the exclusive logstore. You cannot write other data to this logstore by using API, SDK or other methods.

  Note:
  The exclusive logstore has no special limits in query, statistics, alerts, streaming consumption and other functions.

· Basic configurations, such as the storage period of log entries, cannot be modified.

· The exclusive logstore is not billed.

  To use the exclusive logstore, you must enable Log Service for your account. The exclusive logstore is not billed.

  Note:
  When your Log Service is overdue, the WAF log collection feature is suspended until you pay the bills in a timely manner.

· Do not delete or modify the configurations of the project, logstore, index, and dashboards, which are created by Log Service by default. Log Service updates

the WAF log query and analysis service on an irregular basis. The index of the exclusive logstore and the default reports are also updated automatically.

- If you want to use the WAF log query and analysis service with a RAM user, you must grant the required Log Service permissions to the RAM user. For more information about how to grant permissions, see*Grant log query and analysis permissions to a RAM user*.

7.5 Log Analyses

The Real-time Log Query and Analysis Service page in the Web Application Firewall (WAF) console is integrated with the Log Analyses feature and the Log reports feature. After *enabling the WAF log collection feature* for a domain, you can perform real-time query and analysis, view or edit dashboards, and set up monitoring and alarms in the Real-time Log Query and Analysis Service page.

Procedure

1. Log on to the *Web Application Firewall console*, and choose App Market > App Management.
2. Click on the Real-time Log Query and Analysis Service area to open the Log Service page.
3. Select the domain and check that the Status switch on the right is turned on.
4. Click Log Analyses.

   The current page is integrated with the Querying and analyzing page. A query statement is automatically inserted. For example, `matched_ho st : " www . aliyun . com "` is used to query all log entries that is related to the domain in the statement.
5. Enter a query and analysis statement, select a log time range, and then click Search & Analysis.

More operations

The following operations are available in the Log Analyses page.

- Customize query and analysis

  Log Service provides rich query and analysis syntax for querying log entries in a variety of complex scenarios. For more information, see the *Custom query and analysis* in this topic.

- View the distribution of log entries by time period

  Under the query box, you can view the distribution of log entries that are filtered by time period and query statement. A histogram is used to indicate the distribution, where the horizontal axis indicates the time period, and the vertical axis indicates the number of log entries. The total number of the log entries in the query results is also displayed.

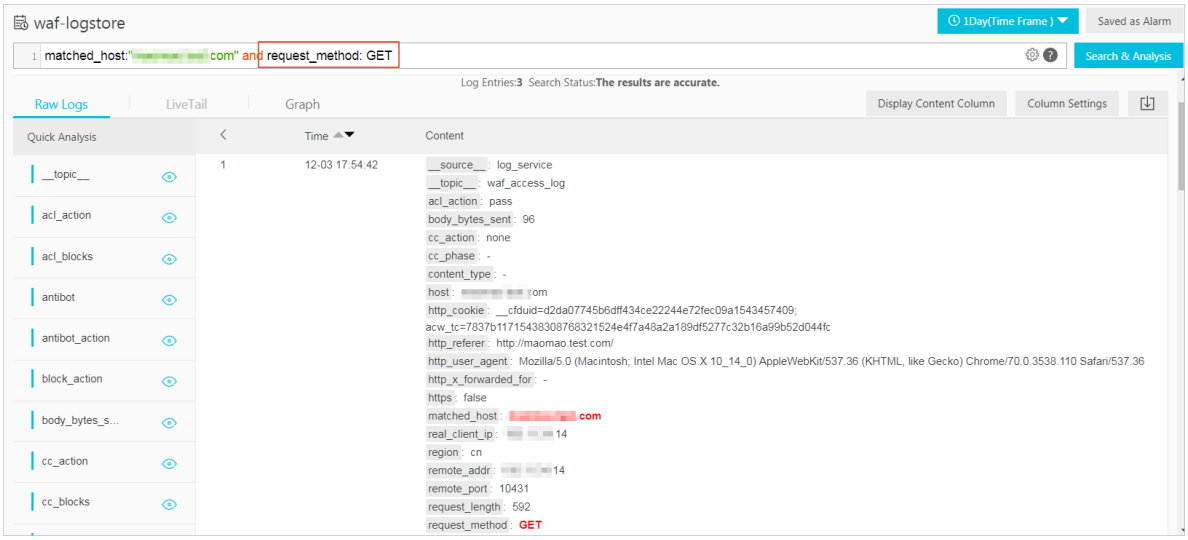
  > **Note:**
  > You can hold down the left mouse button and drag the histogram to select a shorter period. The `time picker` automatically updates the time period, and the query results are also updated based on the updated time period.

- View raw log entries

  In the Raw Logs tab, each log entry is detailed in a single page, which includes the time when the log entry is generated, the content, and the properties in the log entry. You can click Display Content Column to configure the display mode (Full Line or New Line) for long strings in the Content column. You can click Column Settings to display specific fields, or click the Download Log button to download the query results.

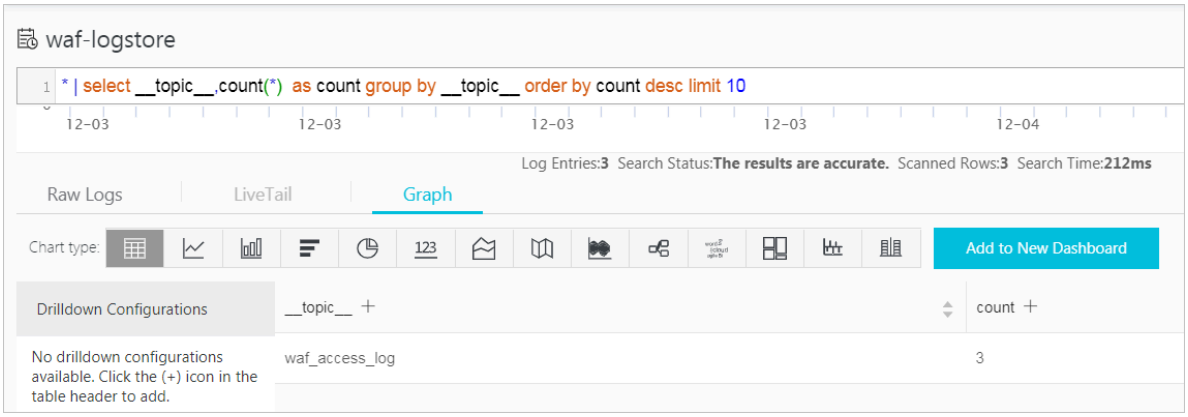
  Additionally, you can click a value or a property name to add a query criterion to the query box. For example, if you click the value `GET` in the `request_me thod : GET` filed, the query statement in the query box is updated to:

  ```
  < The original query statement > and request_me thod : GET
  ```



- View analysis graphs

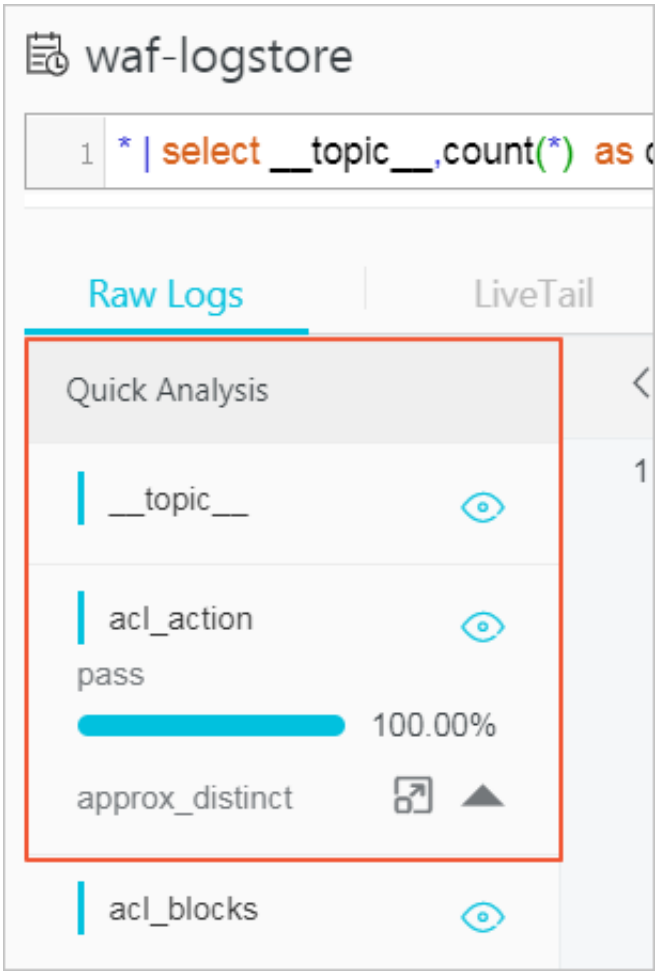
  Log Service enables you to display the analysis results in graphs. You can select the graph type as needed in the Graph tab. For more information, see *Analysis graph*.



- Perform quick analysis

  The Quick Analysis feature in the Raw Logs tab provides you with an one-click interactive experience, which gives you a quick access to the distribution of log entries by a single property within a specified time period. This feature can reduce

the time used for indexing key data. For more information, see *Quick analysis* in the following section.



Customize query and analysis

The log query statement consists of the query (Search) and the analysis (Analytics). These two parts are divided by a vertical bar (|):

```
$ Search  | $ Analytics
```

Type	Description
Query (Search)	A keyword, a fuzzy string, a numerical value, a range, or other criteria can be used in the query criteria. A combined condition can also be used. If the statement is empty or only contains an asterisk (*), all log entries are displayed.
Analysis (Analytics)	Performs computing and statistics to the query results or all log entries.

Note:

Both the query part and the analysis part are optional.

- When the query part is empty, all log entries within the time period are displayed. Then, the query results are used for statistics.
- When the analysis part is empty, only the query results are returned without statistics.

Query syntax

The query syntax of Log Service supports full-text index and field search. You can enable the New Line display mode, syntax highlighting, and other features in the query box.

- Full text index

  You can enter keywords without specifying properties to perform the query by using the full-text index. You can enter the keyword with double quotation marks ("") surrounded to query log entries that contain the keyword. You can also add a space or `and` to separate keywords.

  Examples

  - Multiple-keywords query

    The following statements can be used to query all log entries that contain `www . aliyun . com` and `error` .

    `www . aliyun . com error` or `www . aliyun . com and error` .

  - Criteria query

    The following statement can be used to search for all log entries that contain `www . aliyun . com` , `error` or `404` .

    ```
    www . aliyun . com and ( error or 404 )
    ```

  - Prefix query

    The following statement can be used to query all log entries that contain `www . aliyun . com` and start with `failed_` .

    ```
    www . aliyun . com and failed_ *
    ```

    Note:

An asterisk (*) can be added as a suffix, but it cannot be added as a prefix. For example, the statement cannot be `* _error` .

- Field search

  You can perform a more accurate query based on specified fields.

  The field search supports comparison queries for fields of numeric type. The format is `field name : value` or `field name >= value` . Moreover, you can perform combination queries using `and` or `or` , which can be used in combination with the full text index.

  Note:
  The log entries that record access, operation, and attack on the domain name in WAF Log Service can also be queried by fields. For more information about the meaning, type, format, and other information of the fields, see *Fields in the WAF log entries*.

  Examples

  - Multiple-fields query

    The following statement can be used to query all log entries that record the HTTP flood attack on the `www . aliyun . com` domain and are intercepted by WAF .

    ```
    matched_ho st : www . aliyun . com and cc_blocks : 1
    ```

    If you want to query all log entries that record access from a specific client whose IP address is `1 . 2 . 3 . 4` to `www . aliyun . com` , and access is blocked by the 404 error, you can use the following statement.

    ```
    real_clien t_ip : 1 . 2 . 3 . 4 and matched_ho st : www .
    aliyun . com and status : 404
    ```

    Note:

In this example, the `matched_ho st` , `cc_blocks` , `real_clien t_ip` , and `status` fields are the fields defined in the WAF log.

- Numeric fields query

  The following statement can be used to query all log entries where the response time exceeds five seconds.

  ```
  request_ti me_msec > 5000
  ```

  Range query is also supported. For example, you can query all log entries where the response time exceeds five seconds and is no more than 10 seconds.

  ```
  request_ti me_msec in ( 5000 10000 ]
  ```

  Note:

  The following query statement has the same function.

  ```
  request_ti me_msec > 5000 and request_ti me_msec <=
  10000
  ```

- Field existence query

  You can perform a query based on the existence of a field.

  ■ The following statement can be used to search for all log entries where the `ua_browser` field exists.

  ```
  ua_browser : *
  ```

  ■ The following statement can be used to search for all log entries where the `ua_browser` field does not exist.

  ```
  not ua_browser : *
  ```

For more information about the query syntax that is supported by Log Service, see*Index and query*.

Syntax for analysis

You can use the SQL/92 syntax for log analysis and statistics.

For more information about the syntax and functions supported by Log Service, see*Syntax description*.

Note:

- The `from table name` part that follows the SQL standard syntax can be omitted from the analysis statement. In WAF Log Service, `from log` can be omitted.
- The first 100 results are returned by default, and you can modify the number of results that are returned by using the *LIMIT syntax*.

Examples of query and analysis

Time-based log query and analysis

Each WAF log entry has a `time` field, which is used to represent the time when the log entry is generated. The format of the value in this field is `< year >-< month >-< day > T < hour >:< minute >:< second >+< time zone >`. For example, `2018 - 05 - 31T20 : 11 : 58 + 08 : 00` is 20:11:58 `UTC + 8` (Beijing Time), May 15, 2018.

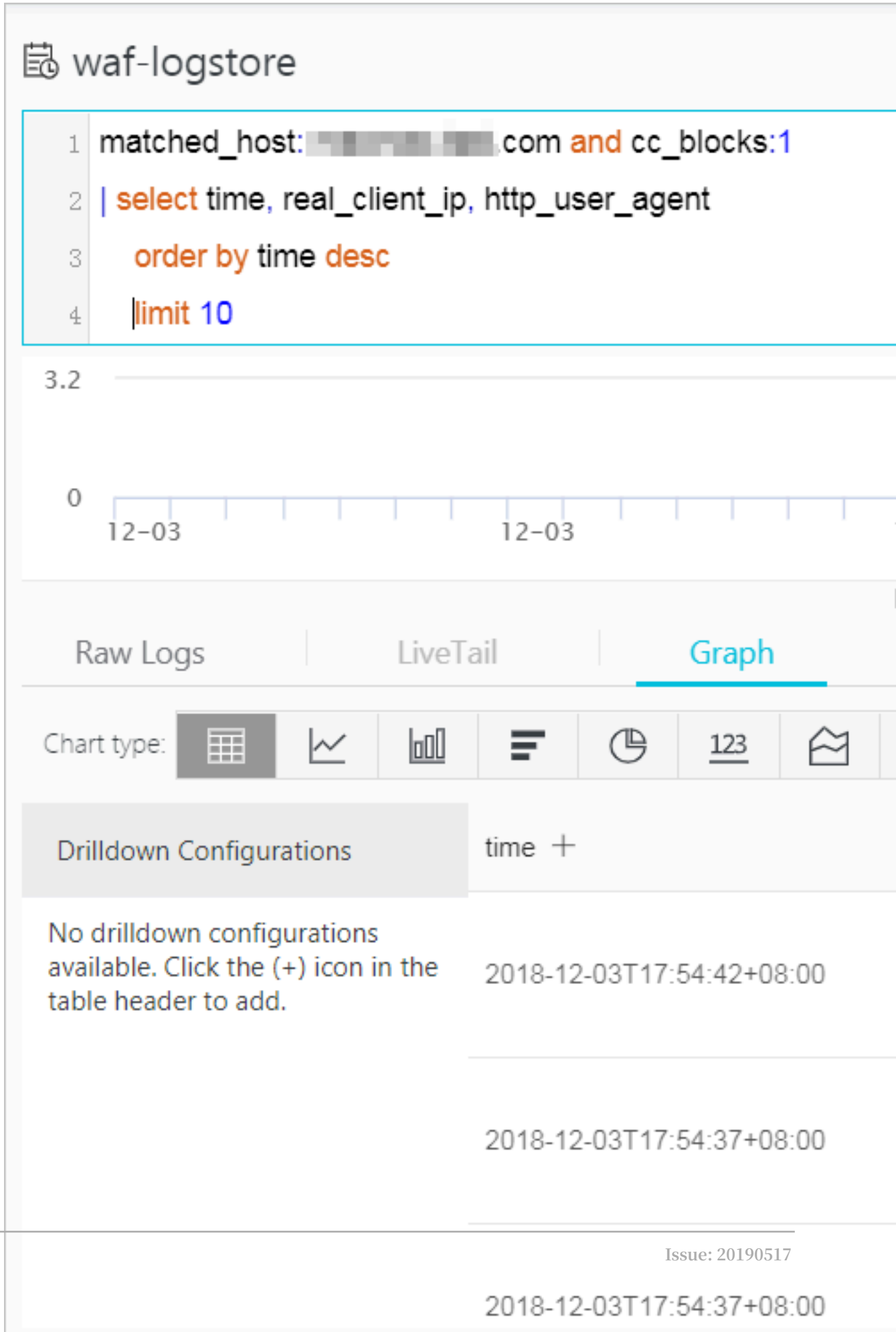
In addition, each log entry has a built-in field `__time__`, which is also used to indicate the time when the log entry is generated. This field is used for calculation when performing statistics. The format of this field is a *Unix timestamp*, and the value of this field indicates the number of seconds that have elapsed since 00:00:00 Coordinated Universal Time (UTC), January 1, 1970. Therefore, if you want to display a calculated result, you must convert the format first.

- Select and display the time

  You can query the log based on the `time` field. For example, you can search for the last 10 log entries that record the HTTP flood attacks on `www . aliyun . com` and are intercepted by WAF. Then, you can display the time field, the source IP field, and the client field.

```
matched_ho st : www . aliyun . com and cc_blocks : 1
| select time , real_clien t_ip , http_user_ agent
order by time desc
```

```
    limit   10
```


waf-logstore
1 matched_host: com and cc_blocks:1
2 | select time, real_client_ip, http_user_agent
3 order by time desc
4 limit 10
3.2
0
12-03
12-03
Raw Logs
LiveTail
Graph
Chart type:
123
Drilldown Configurations
time +
No drilldown configurations available. Click the (+) icon in the table header to add.
2018-12-03T17:54:42+08:00
2018-12-03T17:54:37+08:00
2018-12-03T17:54:37+08:00

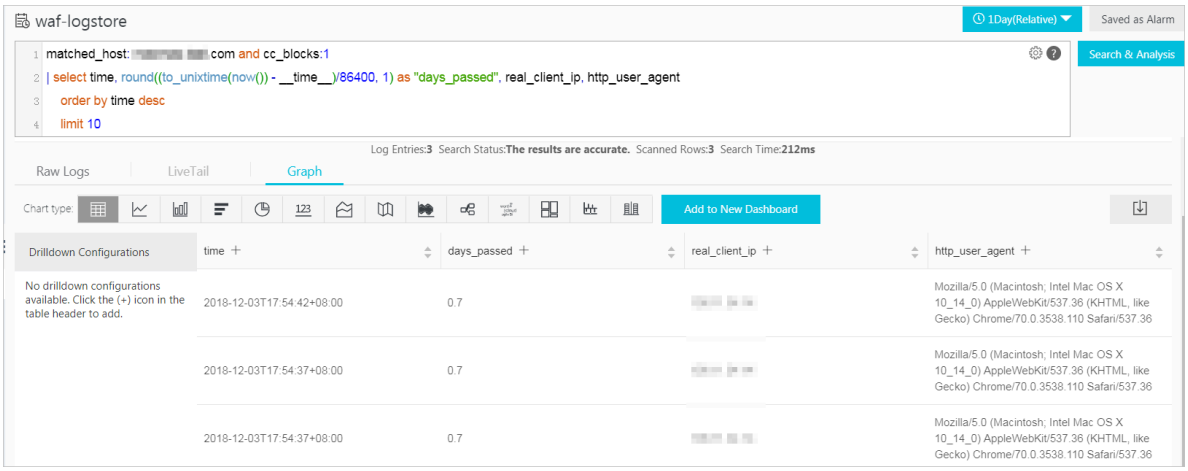
- Calculate using time.

  You can use the `__time__` field to calculate using time. For example, you can calculate the number of days that have elapsed since the domain suffered a HTTP flood attack.

```
matched_ho  st :  www . aliyun . com  and  cc_blocks :  1
round (( to_unixtim  e ( now ()) -  __time__ )/ 86400 ,  1 )  as  "
days_passe  d ",  real_clien  t_ip ,  http_user_  agent
      order  by  time  desc
      limit  10
```

  Note:

  In this example, `round (( to_unixtim  e ( now ()) -  __time__ )/ 86400 ,  1 )` is used to calculate the number of days that have elapsed since the domain had a HTTP flood attack. First, use `now ()` to get the current time, and convert the current time into a Unix timestamp using `to_unixtim  e` . Then, subtract the converted time with the value of the built-in field `__time__` to get the number of seconds that have elapsed. Finally, divide it by `86400` (the total number of seconds in a day) and apply the `round ( data ,  1 )` function to keep one decimal place. The result is the number of days that have elapsed since each attack log entry is generated.



- Perform group statistics based on a specific time

  You can query the log based on the trend of HTTP flood attacks on the domain within a specified time period.

```
 matched_ho  st :  www . aliyun . com  and  cc_blocks :  1
|  select  date_trunc (' day ',  __time__ )  as  dt ,  count ( 1
 )  as  PV
      group  by  dt
```

```
        order   by   dt
```

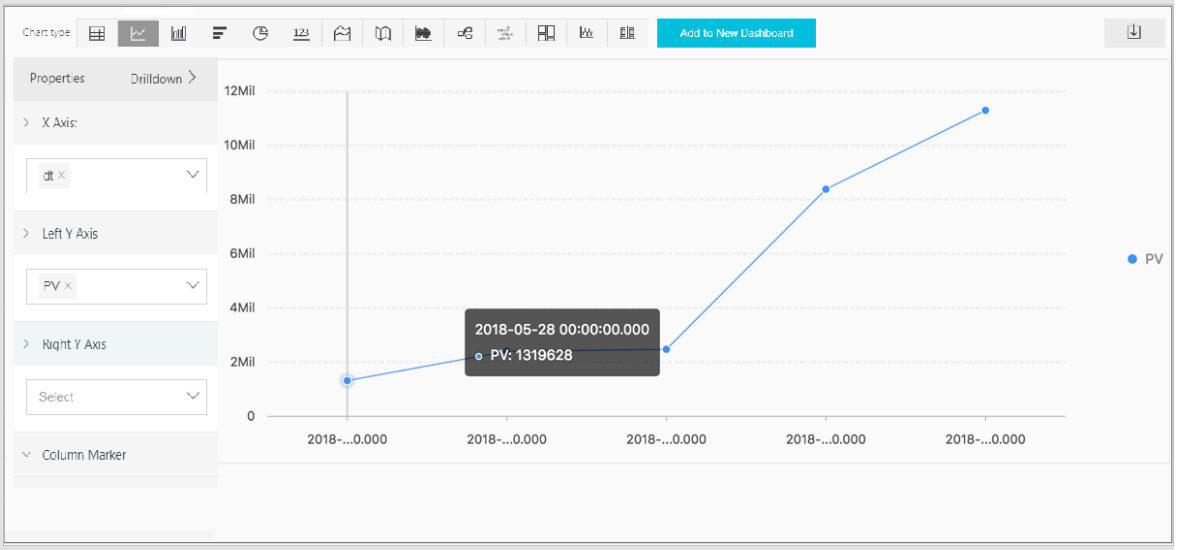
Note:

In this example, the built-in field `__time__` is used by the `date_trunc ('day', ..)` function to align the time of the entries by day. Each log entry is assigned to a group based on the day when the log entry is generated. The total number of log entries in each group is counted using count(1). Then, these entries are ordered by the group. You can use other values for the first parameter of the `date_trunc` function to group the log entries based on other time units, such as `second`, `minute`, `hour`, `week`, `month`, and `year`. For more information about this function, see *Date and time functions*.

dt +	PV +
2018-12-03 00:00:00.000	3

Note:

You can also display the results with a line chart.



- Perform group statistics based on time.

  If you want to analyze the log based on time using more flexible groupings, complex calculations are required. For example, you can query the log based on the trend of HTTP flood attacks on the domain within every five minutes.

```
 matched_ho  st :  www . aliyun . com   and   cc_blocks :  1
|  select   from_unixt  ime ( __time__  -  __time__ %  300 )  as
 dt ,
         count ( 1 )  as   PV
```

```
        group   by   dt
        order   by   dt
        limit   1000
```

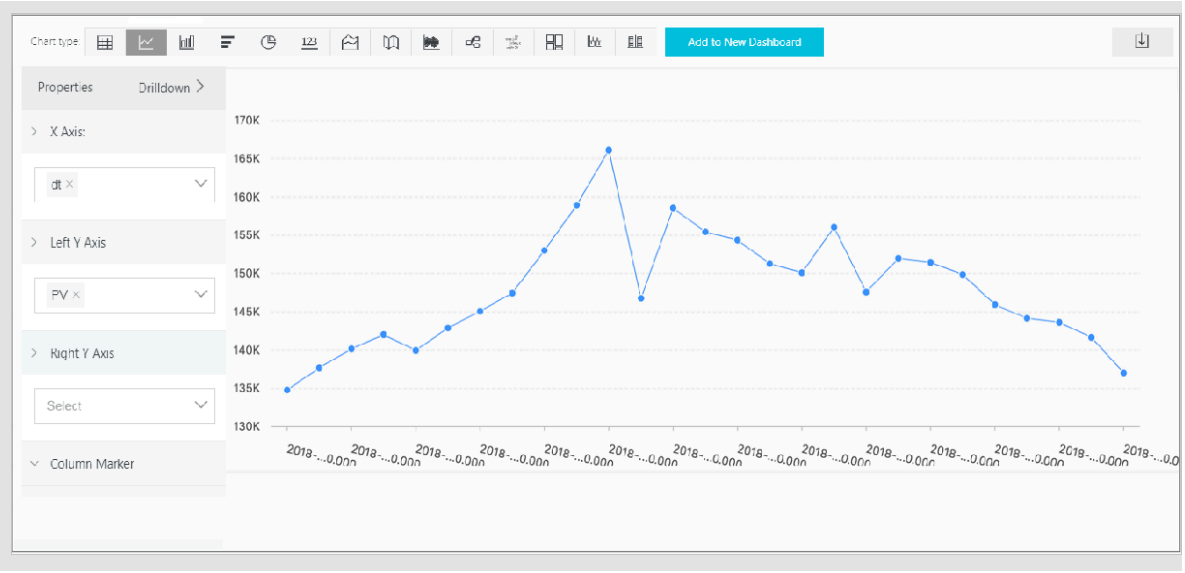
Note:

In this example, the built-in field is used for aligning the time by using the formula `__time__ - __time__ % 300`, and the `from_unixt ime` function converts the format of the result. Then, each entry is assigned to a group that indicates a time period of five minutes (300 seconds), and the total number of log entries in each group is counted using count(1). Finally, the query results are ordered by group and the first 1,000 results are returned, which include the log entries that are generated within 83 hours before the specified time period.

dt	PV
2018-05-31 21:30:00.000	134795
2018-05-31 21:35:00.000	137691
2018-05-31 21:40:00.000	140171
2018-05-31 21:45:00.000	142037
2018-05-31 21:50:00.000	139958
2018-05-31 21:55:00.000	142906
2018-05-31 22:00:00.000	145093
2018-05-31 22:05:00.000	147474

Note:

You can also display the results with a line graph.



The `date_parse` and `date_forma t` functions are used to convert the time format. For more information about the functions that can be used to parse the time field, see *Date and time functions*.

Client IP address-based log query and analysis

The WAF log contains the field `real_clien t_ip`, which reflects the real client IP address. In cases where the user accesses your website through a proxy server, or the IP address in the request header is wrong, you cannot get the real IP address of the user. However, the `remote_add r` field forms a direct connection to the client, which can be used to get the real IP address.

- Classify attackers by country

  You can query the log based on the distribution of HTTP flood attackers by country.

```
 matched_ho  st :  www . aliyun . com  and  cc_blocks :  1
|  SELECT  ip_to_coun  try ( if ( real_clien  t_ip ='-',
 remote_add  r ,  real_clien  t_ip ))  as  country ,
          count ( 1 )  as  " number  of  attacks "
          group  by  country
```

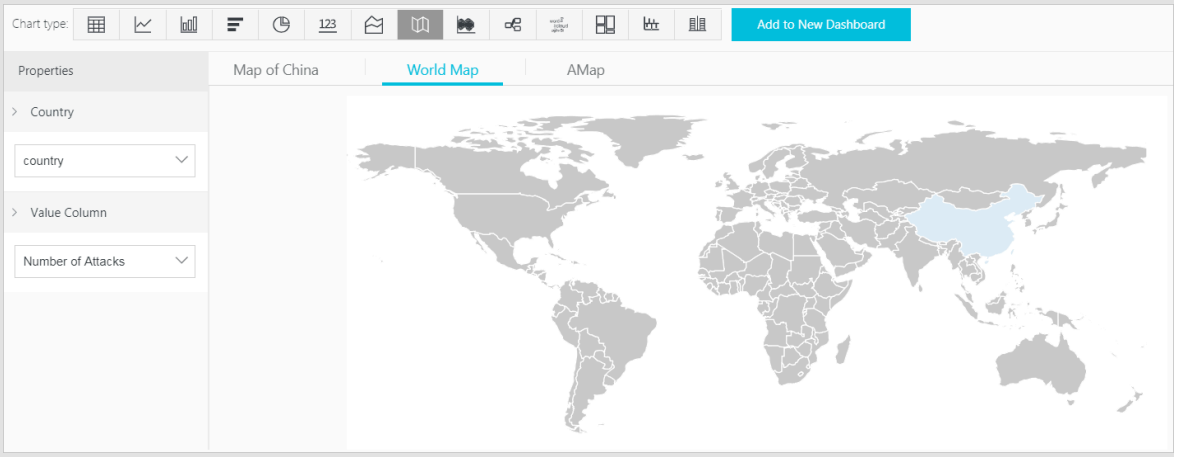
Note:

In this example, the function `if ( condition , option1 , option2 )` returns the real client IP address. If `real_clien t_ip` is `-`, the function returns the value of `remote_add r`. Otherwise, the function returns

`real_clien t_ip` . Then, use the `ip_to_coun try` to get the country information from the IP address of the client.

Note:

You can also display the results with a world map.



- Distribution of visitors by province

  If you want to get the distribution of visitors by province, you can use the `ip_to_prov ince` function to get the province information from the IP addresses.

```
matched_ho st : www . aliyun . com and cc_blocks : 1
| SELECT ip_to_prov ince ( if ( real_clien t_ip ='-',
remote_add r , real_clien t_ip )) as province ,
        count ( 1 ) as " number of attacks "
        group by province
```

Note:

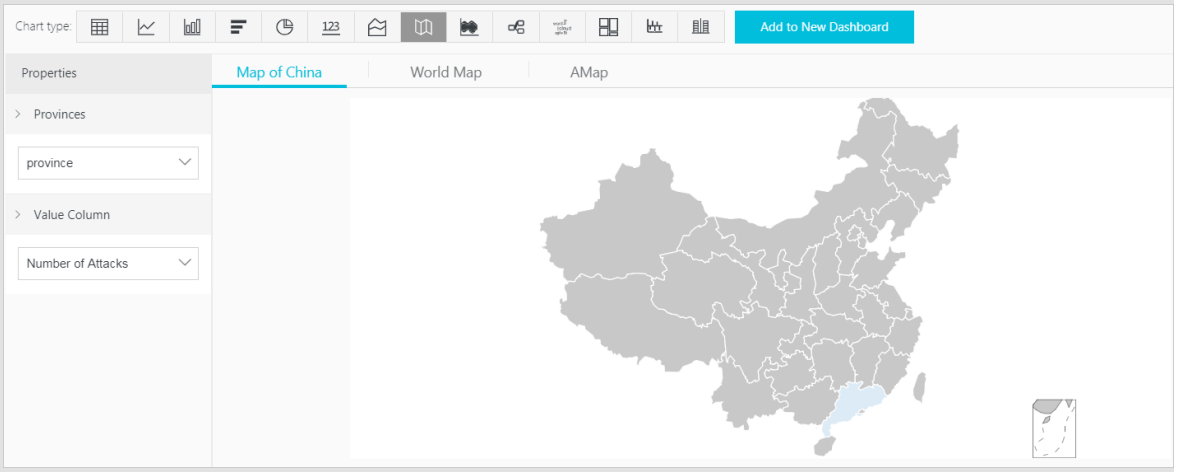
In this example, the `ip_to_prov ince` function is used to get the country information from the real IP address of the client. If the IP address is not in the Mainland of China, the function returns the province or state of the IP address

in the country field. However, if you choose to display the results with a map of China, IP addresses that are not in the Mainland of China are not displayed.

province	Number of Attacks
广东省	3

Note:

You can also display the results with a map of China.



- Heat map that indicates the distribution of attackers

  You can use the `ip_to_geo` function to get the geographic information (the latitude and the longitude) from the real IP addresses of the clients. This information can be used to generate a heat map to indicate the density of attacks.

```
 matched_ho  st :  www . aliyun . com   and   cc_blocks :  1
|  SELECT   ip_to_geo ( if ( real_clien  t_ip ='-',  remote_add  r
 ,  real_clien  t_ip ))  as   geo ,
          count  ( 1 )  as  " number   of   attacks "
          group   by   geo
          limit   10000
```

Note:

In this example, the `ip_to_geo` function is use to get the latitude and the longitude from the real IP addresses of the clients. The first 10,000 results are returned.

Select Amap and click Show Heat Map.

The `ip_to_prov ider` function can be used to get the IP provider name, and the `ip_to_doma in` function can be used to determine whether the IP is a public IP or

a private IP. For more information about the functions that can be used to resolve IP addresses, see *IP functions*.

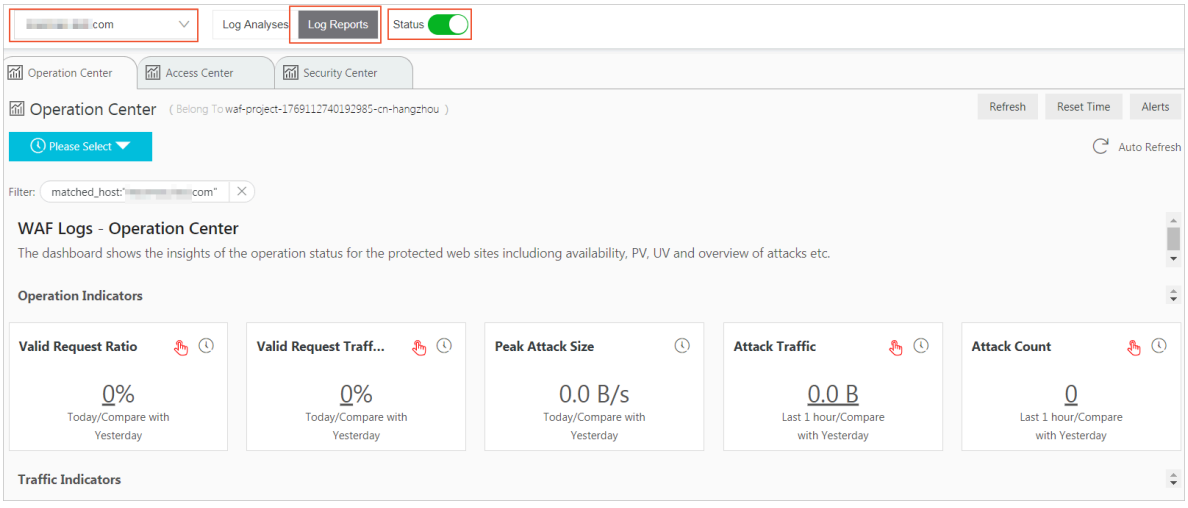
7.6 Log Reports

The Log Reports page is integrated with the Dashboard page of Log Service. On this page, you can view default dashboards. You can filter business and security data about your website by modifying the time range or adding filters.

View reports

1. Log on to the *Web Application Firewall console*, and choose App Market > App Management.
2. Click the Real-time Log Query and Analysis Service area to open the Log Service page.
3. [DO NOT TRANSLATE]
4. Select a domain and check that the Status switch on the right is turned on.
5. Click Log Reports.

   The page that appears is integrated with the Dashboard page of Log Service. A filter is automatically added to display all log entries that are recorded for the domain you selected. In this example, the filter is `matched_ho st : www . aliyun . com` .

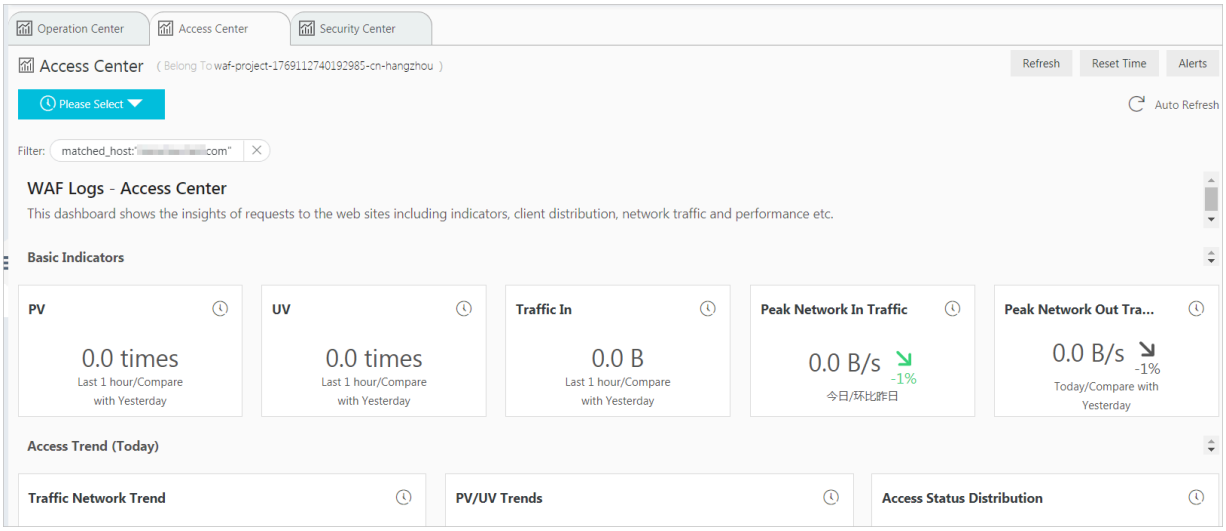


After you enable the WAF log collection feature, Log Service creates three dashboards by default: the Operation Center, Access Center, and Security Center.

Note:

For more information about the default dashboards, see *Default dashboards*.

Dashboard	Description
Operation Center	Displays operation details such as the proportion of valid requests and the statistics of attacks, traffic details such as the peak of both inbound and outbound throughput and the number of requests received, operation trends, attack overview, and other information.
Access Center	Displays basic access details such as the number of page views (PV) and the number of unique visitors (UV), the access trend, the distribution of visitors, and other information.
Security Center	Displays basic index information of attacks, attack types, attack trend, attacker distribution, and other information.



Note:

Dashboards displays various reports using the layout that is predefined in WAF Log Service. The following table describes the graph types supported for reports. For more information about the graph types supported by Log Service, see *Graph description*.

Type	Description
Number	Graphs of this type display important metrics, such as the valid request ratio and the peak of attacks.

Type	Description
Line chart and area chart	Graphs of these types display the trend of important metrics within a specified time period, such as the trend of inbound throughput and the trend of attack interceptions.
Map	Graphs of this type display the geographical distribution of visitors and attackers, for example, by country. Heat maps are also supported to illustrate the distribution of attackers.
Pie chart	Graphs of this type display a distribution, such as the distribution of attackers and the distribution of client types.
Table	Graphs of this type display a table that contains information, such as information of attackers.
Map	Graphs of this type display the geographical distribution of data.

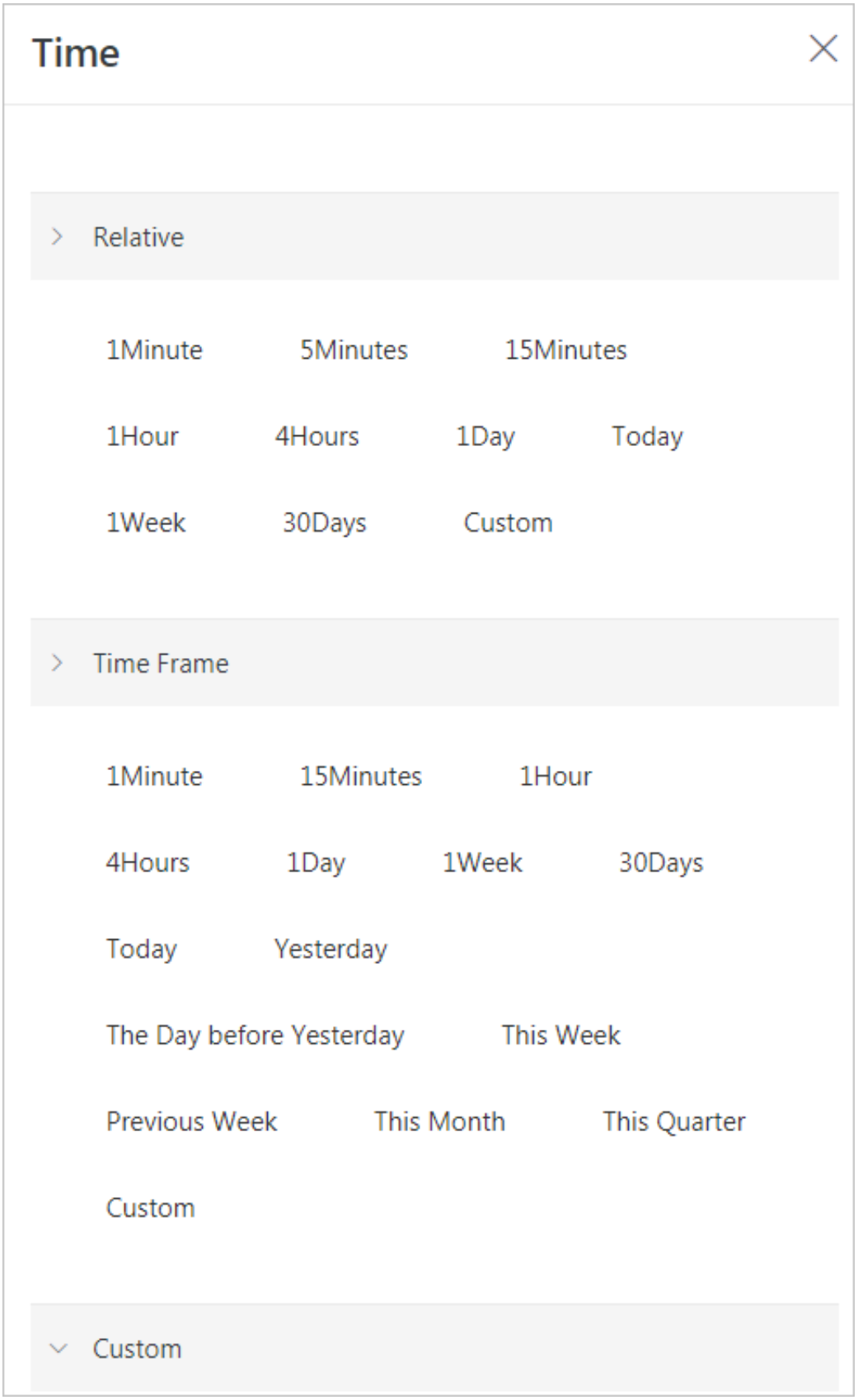
Time selector

The data in all graphs on the dashboard page are generated based on different time ranges. If you want to unify the time ranges, configure the time selector.

1. On the Log Reports page, click Please Select and
2. select a time range in the pane that appears. You can select a relative time, a time frame, or customize a time range.

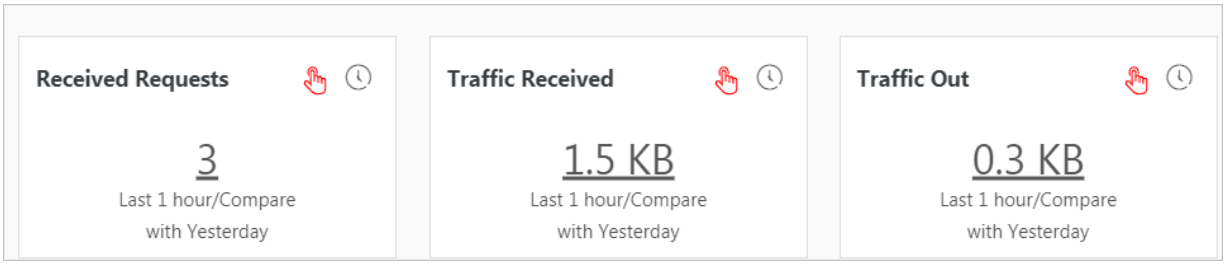
Note:

- After you set a time range, the time range is applied to all reports.
- If you set a time range, a temporary view is generated on the current page. When you view reports next time, the default time range is used.
- To change the time range for a single report in the dashboard, click in the upper-right corner.


Time
Relative
1Minute
5Minutes
15Minutes
1Hour
4Hours
1Day
Today
1Week
30Days
Custom
Time Frame
1Minute
15Minutes
1Hour
4Hours
1Day
1Week
30Days
Today
Yesterday
The Day before Yesterday
This Week
Previous Week
This Month
This Quarter
Custom
Custom

Data drilldown

The drilldown operation is enabled for some graphs on the dashboard page, which provides you a quick access to the detailed data.



The drilldown operation is available for graphs marked with a icon in the upper-right corner. You can click a number with an underline to view the detailed underlying data. For example, to quickly find the domains that are attacked and the number of attacks, click the number in the Attacked Hosts graph of the Security Center report.

Note:
Alternatively, switch to the Raw Log tab to find the relevant log entries.

Description of values in default dashboards

- Operation Center: Displays operation details such as the proportion of valid requests and the statistics of attacks, traffic details such as the peak of both inbound and outbound throughput and the number of requests received, the operation trend, the attack overview, and other information.

Graph	Type	Default time range	Description	Example
Valid Request Ratio	Single value	Today (time frame)	Displays the percentage of valid requests in all requests. A valid request is a request that is neither an attack nor a request that is blocked by a 400 error.	95%

Graph	Type	Default time range	Description	Example
Valid Request Traffic Ratio	Single value	Today (time frame)	Displays the percentage of the traffic generated by valid requests in the traffic generated by all requests.	95%
Peak Attack Size	Single value	Today (time frame)	Displays the peak of attack traffic, which is measured in Bps.	100 B/s
Attack Traffic	Single value	1 hour (relative)	Displays the total attack traffic, which is measured in B.	30 B
Attack Count	Single value	1 hour (relative)	The total number of attacks.	100
Peak Network In	Single value	Today (time frame)	Displays the peak inbound throughput , which is measured in KB/s.	100 KB/s
Peak Network Out	Single value	Today (time frame)	Displays the peak outbound throughput, which is measured in KB/s.	100 KB/s
Received Requests	Single value	1 hour (relative)	Displays the total number of valid requests.	7,800
Received traffic	Single value	1 hour (relative)	Displays the total inbound traffic that is generated by valid requests, which is measured in MB.	1.4 MB
Traffic Out	Single value	1 hour (relative)	Displays the total outbound traffic that is generated by valid requests, which is measured in MB.	3.8 MB

Graph	Type	Default time range	Description	Example
Network Traffic In And Attack	Area chart	Today (time frame)	Displays the trends of throughput generated by valid requests and attacks, which is measured in Kbit/s.	-
Request And Interception	Line chart	Today (time frame)	Displays the trends of valid requests and requests that are intercepted, which is measure in Kbit/h.	-
Access Status Distribution	Flow chart	Today (time frame)	Displays the trends of requests with different status codes (404, 304, 200, and other status codes), which is measured in Kbit/h.	-
Attack Source (World)	World map	1 hour (relative)	Displays the distribution of attackers by country.	-
Attack Source (China)	Map of China	1 Hour (Relative)	Displays the distribution of attackers in China by province.	-
Attack Type	Pie chart	1 hour (relative)	Displays the distribution of attacks by attack type.	-
Attacked Hosts	Tree map	1 hour (relative)	Displays the domains that are attacked and the number of attacks.	-

- Access center: Displays basic access details such as the number of PV and the number of UV, the access trend, the distribution of visitors, and other information.

Graph	Type	Default time range	Description	Example
PV	Single value	1 hour (relative)	Displays the total number of PV.	100,000
UV	Single value	1 hour (relative)	Displays the total number of UV.	100
Traffic In	Single value	1 hour (relative)	Displays the total inbound traffic, which is measured in MB.	300 MB
Peak Network In Traffic	Single value	Today (time frame)	Displays the peak inbound throughput , which is measured in KB/s.	0.5 KB/s
Peak Network Out Traffic	Single value	Today (time frame)	Displays the peak outbound throughput, which is measured in KB/s.	1.3 KB/s
Traffic Network Trend	Area chart	Today (time frame)	Displays the trends of inbound and outbound throughput, which are measured in KB/ s.	-
PV/UV Trends	Line chart	Today (time frame)	Displays the trends of PV and UV, which is measured in Kbit/ h.	-
Access Status Distribution	Flow chart	Today (time frame)	Displays the trends of requests with different status codes (404, 304, 200 , and other status code), which is measured in Kbit/h.	-

Graph	Type	Default time range	Description	Example
Access Source	World map	1 hour (relative)	Displays the distribution of attackers by country.	-
Traffic In Source (World)	World map	1 hour (relative)	Displays the distribution (by country) of inbound traffic from requests.	-
Traffic In Source (China)	Map of China	1 hour (relative)	Displays the distribution (by province) of inbound traffic from requests in China.	-
Access Heatmap	Amap	1 hour (relative)	Displays the heat map that indicates the source distribution of requests by geographical position.	-
Network Provider Source	Pie chart	1 hour (relative)	Displays the source distribution of requests by Internet service provider that provides network for the source, such as China Telecom , China Unicom, China Mobile, and universities.	-
Referer	Table	1 hour (relative)	Displays the first 100 referer URLs which the hosts are most often redirected from, and displays the information of hosts and redirection frequency.	-

Graph	Type	Default time range	Description	Example
Mobile Client Distribution	Pie chart	1 hour (relative)	Displays the distribution of requests from mobile clients, by client type.	-
PC Client Distribution	Pie chart	1 hour (relative)	Displays the distribution of requests from PC clients, by client type .	-
Request Content Type Distribution	Pie chart	1 hour (relative)	Displays the distribution of request sources by content type, such as HTML, form, JSON, and streaming data.	-
Accessed Sites	Tree map	1 Hour (Relative)	Displays the addresses of 30 domains that are visited most.	-
Top Clients	Table	1 hour (relative)	Displays the information of 100 clients that visit your domains most. The information includes the client IP address , the region and city, network information , the request method , inbound traffic , the number of incorrect accesses , the number of attacks, and other information.	-

Graph	Type	Default time range	Description	Example
URL With Slowest Response	Table	1 hour (relative)	Displays the information of 100 URLs that have the longest response times. The information includes the website address, the URL, the average response time, the number of accesses, and other informatio n.	-

- Security Center: Displays basic details of attacks, attack types, the attack trend, the distribution of attackers, and other information.

Chart	Type	Default time range	Description	Example
Peak Attack Size	Single value	1 hour (relative)	Displays the peak of the throughput when your website is suffering attacks, which is measured in Bps.	100 B/s
Attacked Hosts	Single value	Today (time frame)	Displays the number of domains that are attacked.	3
Source Country Of Attack	Single value	Today (time frame)	Displays the number of countries that are attack sources.	2
Attack Traffic	Single value	1 hour (relative)	Displays the total amount of traffic that is generated by attacks, which is measured in B.	1 B
Attacker UV	Single value	1 hour (relative)	Displays the number of unique clients that are attack sources.	40

Chart	Type	Default time range	Description	Example
Attack type distribution	Flow chart	Today (time frame)	Displays the distribution of attacks by attack type.	-
Intercepted Attack	Single value	1 hour (relative)	Displays the number of attacks that are intercepted by WAF.	100
HTTP flood attack Interception	Single value	1 hour (relative)	Displays the number of HTTP flood attacks that are intercepted by WAF.	10
Web Attack Interception	Single value	1 hour (relative)	Displays the number of Web applicatio n attacks that are intercepted by WAF.	80
Access Control Event	Single value	1 hour (relative)	Displays the number of requests that are intercepted by the HTTP ACL policies of WAF.	10
HTTP flood attack (World)	World map	1 hour (relative)	Displays the distribution of HTTP flood attackers by country.	-
HTTP flood attack (China)	China map	1 hour (relative)	Displays the distribution of HTTP flood attackers by province in China.	-
Web Attack (World)	World map	1 Hour (Relative)	Displays the distribution of Web application attacks by country.	-
Web Attack (China)	Map of China	1 hour (relative)	Displays the distribution of Web application attacks by province in China .	-

Chart	Type	Default time range	Description	Example
Access Control Attack (World)	World Map	1 hour (relative)	Displays the distribution by country of requests that are intercepted by the HTTP ACL policies of WAF.	-
Access Control Attack (China)	Map of China	1 Hour (Relative)	Displays the distribution by province in China of requests that are intercepted by the HTTP ACL policy of WAF.	-
Attacked Hosts	Tree map	1 hour (relative)	Displays the websites that are attacked most.	-
HTTP flood attack Strategy Distribution	Pie chart	1 hour (relative)	Displays the distribution of security policies being activated for HTTP flood attacks.	-
Web Attack Type Distribution	Pie chart	1 hour (relative)	Displays the distribution of Web attacks by attack type.	-
Top Attackers	Table	1 hour (relative)	Displays IP addresses, provinces , and network providers of the first 100 clients that launch the recent attacks, and displays the number of attacks and the amount of traffic generated by these attacks.	-

Chart	Type	Default time range	Description	Example
Attacker Referer	Table	1 Hour (Relative)	Displays the information in referers of attack requests, which includes referer URLs, referer hosts , and the number of attacks.	-

7.7 Fields in the log entry

WAF keeps detailed log entries for your domains, including access requests and attack logs. Each log entry contains dozens of fields. You can perform query and analysis based on specific fields.

Field	Description	Example
__topic__	The topic of the log entry. The value of this field is waf_access _log, which cannot be changed.	waf_access_log
acl_action	The action generated by the WAF HTTP ACL policy to the request, such as pass, drop, and captcha. Note: If the value is null or -, it indicates that the action is pass.	pass
acl_blocks	Indicates whether the request is blocked by the HTTP ACL policy. · If the value is 1, the request is blocked. · If the value is not 1, the request is passed.	1

Field	Description	Example
antibot	The type of the Anti-Bot Service protection strategy that applies, which includes: · ratelimit: Frequency control · sdk: APP protection · intelligence: Algorithmic model · acl: HTTP ACL policy · blacklist: Blacklist	ratelimit
antibot_action	The action performed by the Anti-Bot Service protection strategy, which includes: · challenge: Verifying using an embedded JavaScript script · drop: Blocking · report: Logging the access event · captcha: Verifying using a slider captcha	challenge
block_action	The type of the WAF protection that is activated, which includes: · tmd: Protection against HTTP flood attacks · waf: Protection against Web application attacks · acl: HTTP ACL policy · geo: Blocking regions · antifraud: Risk control for data · antibot: Blocking Web crawlers	tmd
body_bytes_sent	The size of the body in the access request, which is measured in Bytes.	2
cc_action	Protection strategies against HTTP flood attacks, such as none, challenge, pass, close, captcha, wait, login, and n.	close

Field	Description	Example
cc_blocks	Indicates whether the request is blocked by the CC protection. · If the value is 1, the request is blocked. · If the value is not 1, the request is passed.	1
cc_phase	The CC protection strategy that is activated, which can be seccookie, server_ip_blacklist, static_whitelist, server_header_blacklist, server_cookie_blacklist, server_args_blacklist, or qps_overmax.	server_ip_blacklist
content_type	The content type of the access request.	application/x-www-form-urlencoded
host	The source website.	api.aliyun.com
http_cookie	The client-side cookie, which is included in the request header.	k1=v1;k2=v2
http_referer	The URL information of the request source, which is included in the request header. - indicates no URL information.	http://xyz.com
http_user_agent	The User Agent field in the request header, which contains information such as the client browser and the operating system.	Dalvik/2.1.0 (Linux; U; Android 7.0; EDI-AL10 Build/HUAWEIEDISON-AL10)
http_x_forwarded_for	The X-Forwarded-For (XFF) information in the request header, which identifies the original IP address of the client that connects to the Web server using a HTTP proxy or load balancing.	-

Field	Description	Example
https	Indicates whether the request is an HTTPS request. · true: the request is an HTTPS request. · false: the request is an HTTP request.	true
matched_host	The matched domain name (extensive domain name) that is protected by WAF. If no domain has been matched, the value is -.	*.aliyun.com
querystring	The query string in the request.	title=tm_content%3Darticle&pid=123
real_client_ip	The real IP address of the client. If the system cannot get the real IP address, the value is -.	1.2.3.4
region	The information of the region where the WAF instance is located.	cn
remote_addr	The IP address of the client that sends the access request.	1.2.3.4
remote_port	The port of the client that sends the access request.	3242
request_length	The size of the request, measured in Bytes.	123
request_method	The HTTP request method used in the access request.	GET
request_path	The relative path of the request. The query string is not included.	/news/search.php
request_time_msec	The request time, which is measured in microseconds.	44
request_traceid	The unique ID of the access request that is recorded by WAF.	7837b**********ea1f0
server_protocol	The response protocol and the version number of the origin server.	HTTP/1.1

Field	Description	Example
status	The status of the HTTP response to the client returned by WAF.	200
time	The time when the access request occurs.	2018-05-02T16:03:59+08:00
ua_browser	The information of the browser that sends the request.	ie9
ua_browser_family	The family of the browser that the sent the request.	internet explorer
ua_browser_type	The type of the browser that the sent the request.	web_browser
ua_browser_version	The version of the browser that sends the request.	9.0
ua_device_type	The type of the client device that sends the request.	computer
ua_os	The operating system used by the client that sends the request.	windows_7
ua_os_family	The family of the operating system used by the client.	windows
upstream_addr	A list of origin addresses, separated by commas. The format of an address is `IP : Port`.	1.2.3.4:443
upstream_ip	The origin IP address that corresponds to the access request. For example, if the origin server is an ECS instance , the value of this field is the IP address of the ECS instance.	1.2.3.4
upstream_response_time	The time that the origin site takes to respond to the WAF request, which is measured in seconds. "-" indicates the timeout of the request.	0.044

Field	Description	Example
upstream_status	The response status that WAF receives from the origin server. "-" indicates that no response is received. The reason can be the response timeout, or the request being blocked by WAF.	200
user_id	Alibaba Cloud account ID.	12345678
waf_action	The action from the Web attack protection policy. · If the value is block, the attack is blocked. · If the value is bypass or other values, the attack is ignored.	block
web_attack_type	The Web attack type such as xss, code_exec, webshell, sqli, lfilei, rfilei, and other.	xss

7.8 Advanced settings

If you click Advanced Settings on the page of WAF log query and analysis service, you will be redirected to the Log Service console. Then you can set advanced features for Log Service. For example, you can set alarms and notifications, real-time log collection and consumption, shipping log data, or provide visual representations with other products.

Procedure

1. Log on to the *Web Application Firewall console*, choose App Market > App Management.
2. Click the Real-time Log Query and Analysis Service area to open the Log Service page.
3. Click Advanced Settings in the upper-right corner.
4. In the dialog box that appears, click Go to open the Log Service console.

5. In the Log Service console, you can set the following advanced features for log projects and logstores:
   - *Real-time log collection and consumption*
   - *Shipping log data to other Alibaba Cloud storage services in real time*
   - *Providing visual representations with other products*

7.9 Export log entries

The WAF log query and analysis service enables you to export log query results to a local file.

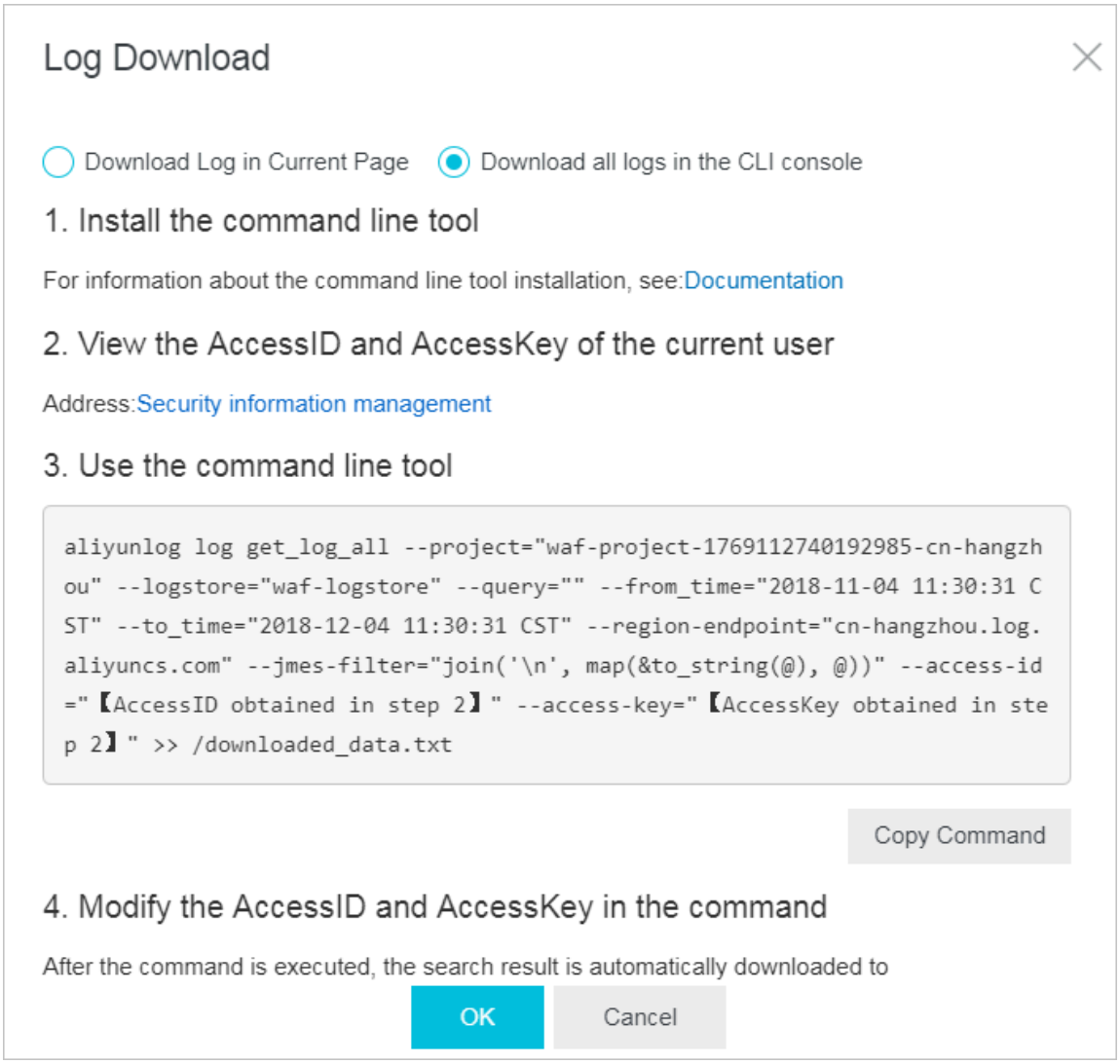
You can export the log entries on the current page to a CSV file, or export all log entries to a TXT file.

Procedure

1. Log on to the *Web Application Firewall console* and choose App Market > App Management.
2. Click the log query and analysis service area to open the Log Service page.
3. On the Raw Logs tab of the Log Service page, click the download button on the right.

   Note:
   The download button does not appear if no result is found for a query.
4. In the Download Log dialog box that appears, select Download Log in Current Page or Download all logs in the CLI console.
   - Download Log in Current Page : Click OK to download the raw log entries on the current page to a CSV file.
   - Download all logs in the CLI console
     a. For more information about installing the command-line interface (CLI), see the *CLI guide*.
     b. Go to the *Security Management* page, and find the AccessKey ID and AccessKey Secret of the current user.
     c. Click Copy Command and paste the command into CLI, replace the `AccessID obtained in step 2` and `AccessKey obtained`

`in step 2` with the AccessKey ID and AccessKey Secret of the current user, and then run the command.



All raw log entries recorded by WAF are automatically downloaded and saved to the download_data.txt file in the directory where the command is run.

7.10 Grant log query and analysis permissions to a RAM user

If you want to use the WAF log query and analysis service with a RAM user, you must grant required permissions to the RAM user using the Alibaba Cloud account.

Context

The following permissions are required for enabling and using the WAF log query and analysis service.

Operation	Required account type and permissions
Enable Log Service (the service remains enabled after this operation)	Alibaba Cloud account
Authorize WAF to write log data to the exclusive logstore in Log Service in real-time (the authorization remains valid after this operation)	· Alibaba Cloud account · RAM user that has the `AliyunLogF ullAccess` permission · RAM user that has specific permissions
Use the log query and analysis service	· Alibaba Cloud account · RAM user that has the `AliyunLogF ullAccess` permission · RAM user that has specific permissions

Grant permissions to RAM users as required.

Scenario	Permission	Procedure
Grant permissions on all Log Service operations to a RAM user.	`AliyunLogF ullAccess`	For more information, see *RAM users*.
Grant the log viewing permission to a RAM user after you enable the WAF log query and analysis service and complete the authorization on the Alibaba Cloud account.	`AliyunLogR eadOnlyAcc ess`	For more information, see *RAM users*.
Grant the RAM user permissions on enabling and using the WAF log query and analysis service. This RAM user is not granted other administrative permissions on Log Service.	Custom authorization policy	For more information, see the following procedure.

Procedure

1. Log on to the *RAM console*.
2. On the Policies page, select the Custom Policy tab.

3. In the upper-right corner of the page, click Create Authorization Policy.
4. Click Create Authorization Policy. In the template, specify the Authorization Policy Name, and then enter the following in the Policy Content field.

Note:

Replace `${ Project }` and `${ Logstore }` in the following policy content with the names of the exclusive project and logstore in WAF Log Service.

```
{
  " Version ": " 1 ",
  " Statement ": [
   {
      " Action ": " log : GetProject ",
      " Resource ": " acs : log :*:*: project /${ Project }",
      " Effect ": " Allow "
    },
    {
      " Action ": " log : CreateProj  ect ",
      " Resource ": " acs : log :*:*: project /*",
      " Effect ": " Allow "
    },
{
      " Action ": " log : ListLogSto  res ",
      " Resource ": " acs : log :*:*: project /${ Project }/
logstore /*",
      " Effect ": " Allow "
    },
    {
      " Action ": " log : CreateLogS  tore ",
      " Resource ": " acs : log :*:*: project /${ Project }/
logstore /*",
      " Effect ": " Allow "
    },
{
      " Action ": " log : GetIndex ",
      " Resource ": " acs : log :*:*: project /${ Project }/
logstore /${ Logstore }",
      " Effect ": " Allow "
    },
    {
      " Action ": " log : CreateInde  x ",
      " Resource ": " acs : log :*:*: project /${ Project }/
logstore /${ Logstore }",
      " Effect ": " Allow "
    },
    {
      " Action ": " log : UpdateInde  x ",
      " Resource ": " acs : log :*:*: project /${ Project }/
logstore /${ Logstore }",
      " Effect ": " Allow "
    },
    {
      " Action ": " log : CreateDash  board ",
      " Resource ": " acs : log :*:*: project /${ Project }/
dashboard /*",
      " Effect ": " Allow "
    },
```

```
{
      " Action ": " log : UpdateDash  board ",
      " Resource ": " acs : log :*:*: project /${ Project }/
dashboard /*",
      " Effect ": " Allow "
    },
{
      " Action ": " log : CreateSave  dSearch ",
      " Resource ": " acs : log :*:*: project /${ Project }/
savedsearc  h /*",
      " Effect ": " Allow "
    },
{
      " Action ": " log : UpdateSave  dSearch ",
      " Resource ": " acs : log :*:*: project /${ Project }/
savedsearc  h /*",
      " Effect ": " Allow "
    }
  ]
}
```

5. Click Create Authorization Policy.
6. Go to the Users page, find the RAM user, and then click Authorize.
7. Add the authorization policy that you created and click OK.
   This RAM user can enable and use the WAF log query and analysis service, and cannot use other features of Log Service.

7.11 Manage log storage

After WAF Log Service is activated, log storage is allocated for your WAF Log Service based on the specified log storage size. You can view the usage of the log storage on the Log Service page in the Web Application Firewall console.

View the usage of the log storage

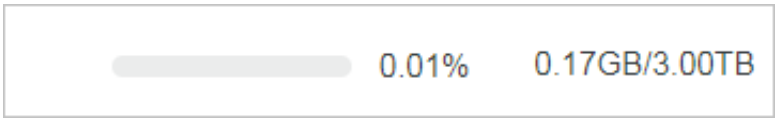
You can view the usage of the log storage that is generated by the WAF log query and analysis service at any time.

Note:

It takes two hours for changes in the storage usage to be updated in the console. You need to upgrade the log storage when only a little log storage space is available.

1. Log on to the *Web Application Firewall console*.
2. Choose App Market > App Management, select the region where your WAF instance is located, and then click Real-time Log Query and Analysis Service.

3. At the top of the Log Service page, view the usage of log storage.



Upgrade log storage

To upgrade the log storage size, click Upgrade Storage at the top of the Log Service page.

> Note:
> If log storage is full, new log data cannot be written to the exclusive logstore. We recommend that you upgrade log storage before log storage is full.

Clear log storage

You can delete all log entries in the log storage as needed. For example, you can delete the log entries generated during the test phase to make full use of the log storage by recording only log entries that is generated during the production phase.

Click Clear at the top of the Log Service page, and click Confirm to delete all log entries in the log storage.

> Notice:
> Log entries that are deleted cannot be restored. Delete log entries with caution.

> Note:
> You can clear the log storage for only a limited number of times.

8 Managed Security Service of WAF

Managed Security Service (MSS) is available in Alibaba Cloud Security Web Application Firewall (WAF). Once you activate the MSS of WAF service, you can get professional and exclusive technical support from Alibaba Cloud Security experts with regard to implementing and using Alibaba Cloud WAF.

Overview

The MSS of WAF service is backed with Alibaba Cloud Security service team and helps you better use Alibaba Cloud WAF. With MSS of WAF, you can more effectively protect WAF-enabled Web assets, reduce Web business risk, and significantly reduce security maintenance costs.

The MSS of WAF service is suitable for situations where you have activated Alibaba Cloud WAF but lack continuous monitoring and security engineers to protect against vulnerabilities. The service is ideal for customers seeking outsourcing professionals to assist in the operation of security services.

Service scope

The MSS of WAF service provides a fully managed service for Alibaba Cloud WAF, including configuration service, protection policy optimization, security monitoring and warning, security incident response, security consulting, security training and case study, and security reporting. These services are further described as follows.

Table 8-1: Service scope of MSS of WAF

Service type	Description
WAF configuration	· Provides WAF configuration for implementing WAF for a website · Assists in configuring and uploading the HTTPS certificate (Users can import the cert and private key by themselves) · Assists in configuring origin server protection for ECS and Server Load Balancer instances · Performs adaptability verification and requesting test after website configuration is completed · Assists in modifying the configuration and policies when the protected website changes

Service type	Description
Protection policy optimization	· Provides diagnosis and troubleshooting services when exceptions occur to services on WAF · Optimizes user security protection policies by analyzing attack logs · Adjusts protection policies and provides mitigation solutions in response to security incidents · Provides suggestions on WAF protection configuration for fault handling, HTTP flood protection, HTTP ACL policy, and data risk control
Monitoring and warming	· Monitors the product availability, faults, and exceptional status · Monitors high-risk security events and abnormal events caused by attacks · Monitor protection status based on the user's or system's attack alerts and makes the adjustment to the protection policies
Security reporting	· Provides customized security service reports for the user · Sends the daily and monthly product operations and service report to the user

Security incident response time

When a user encounters a security incident that requires urgent assistance, the service team responds to the user in a timely manner based on the security incident response time described as follows.

Table 8-2: Security incident response time

No.	Priority	Definition	Response time
1	Critical	The user's critical business or core components are significantly damaged or the service is unavailabl e, requiring immediate processing	15 minutes

No.	Priority	Definition	Response time
2	Emergency	The user's critical business or core components are severely affected or important features are unavailable and need to be processed as soon as possible	30 minutes
3	High	The user's non-critical business is seriously damaged or unavailable	2 hours
4	Medium	The user's non-critical business is abnormal	4 hours
5	Low	General technical or advisory questions	8 hours

Service delivery description

The following table describes the service delivery method of MSS of WAF.

Table 8-3: Service delivery description

Category	Description
Service delivery method	Remote online service
Service language	Chinese and English
Service period	Consistent with the user's purchase cycle
Supported service channels	· Email · DingTalk · Phone

Billing and purchasing method

The MSS of WAF service supports subscription and can be renewed on a monthly or yearly basis. To activate the MSS of WAF, go to the *sales page*.

Notice:
Due to the special investment of the service support system and service human resources, refunds are not supported.