Cloud Firewall

Service Overview

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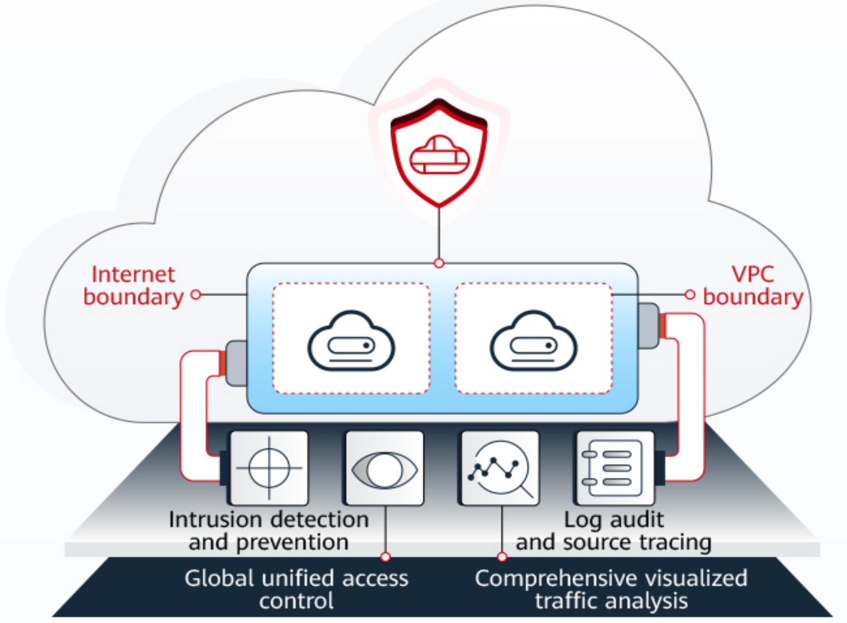
01 What Is CFW?

Cloud Firewall (CFW) is a next-generation cloud native firewall protecting Internet and VPC borders on the cloud. It can detect and defend against intrusions in real time, analyze traffic and visualize results, audit logs, and trace traffic sources. You can scale CFW resources as needed.


Internet boundary
VPC boundary
Intrusion detection and prevention
Log audit and source tracing
Global unified access control
Comprehensive visualized traffic analysis

02 Features

CFW monitors and intercepts internal and external attacks in real time. It intelligently and accurately blocks attacks based on network-wide threat intelligence collected by Huawei.

External attacks

2 What Is CFW?

Cloud Firewall (CFW) is a next-generation cloud-native firewall. It protects the Internet border and VPC border on the cloud by real-time intrusion detection and prevention, global unified access control, full traffic analysis, log audit, and tracing. It employs AI for intelligent defense, and can be elastically scaled to meet changing business needs, helping you easily handle security threats. CFW is a basic service that provides network security protection for user services on the cloud.

Intelligent Defense

CFW has integrated Huawei Cloud/security capabilities and Huawei network threat intelligence. Its AI intrusion prevention engine can detect and block malicious traffic in real time. It works with other security services globally to defend against Trojans, worms, injection attacks, vulnerabilities, and phishing attacks.

High Scalability

CFW can implement refined control on all traffic, including Internet border, cross-VPC, and cross-ECS traffic, to prevent external intrusions, internal penetration attacks, and unauthorized access from internal to external networks. Its bandwidth, number of EIPs, and number of security policies can be increased without limit. Its cluster is deployed in HA mode to protect your workloads under heavy traffic.

Easy-to-Use Application

As a cloud-native firewall, CFW can be enabled easily, import multi-engine security policies with a few clicks, automatically check assets within seconds, and provide a UI for performing operations, greatly improving management and defense efficiency.

Supported Access Control Policies

- Access control based on the 5-tuple (source IP address, source port, destination IP address, destination port, and protocol)
- Access control based on the domain name

- Access control based on the intrusion prevention system (IPS). The IPS works in observation or block mode. In block mode, CFW detects and blocks traffic that matches the IPS rules.
- ACL access control policies set for IP address groups, blacklists, and whitelists

3 Features

CFW provides the standard edition, and the professional edition. You can use access control, intrusion prevention, traffic analysis, and log audit functions on the console.

Table 3-1 Features

Item	Description
Dashboard	You can check basic information about firewall instances, resource protection, and more statistics.
Assets	Manage and view data and information about your EIPs and VPCs.
Access Control	● You can control traffic at Internet and VPC borders based on IP addresses, regions, and domain names. ● You can use the policy assistant to quickly check protection rule hits and adjust rules in a timely manner.

Item	Description
Attack Defense	● IPS: It provides you with basic protection functions, and, with many years of attack defense experience, it detects and defends against a wide range of common network attacks and effectively protects your assets. – Basic defense rule database: It provides threat detection and vulnerability scan based on the built-in IPS rule database. It can scan traffic for phishing, Trojans, worms, hacker tools, spyware, brute-force attacks, vulnerability exploits, SQL injection attacks, XSS attacks, and web attacks. It can also detect protocol anomalies, buffer overflow, access control, suspicious DNS activities, and other suspicious behaviors. **NOTE** In the basic protection rule database, you can manually modify protection actions. You can query rule information by rule ID, signature name, risk level, update time, CVE ID, attack type, rule group, and current action in the basic protection rule database. – Virtual patch database: Hot patches are provided for IPS at the network layer to intercept high-risk remote attacks in real time and prevent service interruption during vulnerability fixing. New IPS rules are displayed in the virtual patch rule library. A new IPS rule will be added to the virtual patch rule library first and then to the IPS rule library. – Custom IPS signature: You can customize IPS signature rules. CFW will detect threats in data traffic based on signatures. **NOTE** HTTP, TCP, UDP, POP3, SMTP and FTP protocols can be configured in user-defined IPS signatures. ● Sensitive directory scan defense: It defends against scan attacks on sensitive directories on your servers. ● Reverse shell defense: It defends against reverse shells. ● Anti-virus: This function identifies and processes virus files through virus feature detection to prevent data damage, permission change, and system breakdown. The antivirus function can check access via HTTP, SMTP, POP3, FTP, IMAP4, and SMB. ● Security dashboard: You can easily check attack defense information on the security dashboard and adjust defense policies in a timely manner.
Traffic Analysis	The following traffic statistics are displayed: ● Inbound traffic: statistics on the total inbound traffic from the Internet to ECSs ● Outbound traffic: statistics on the traffic generated when cloud servers proactively access the Internet ● Inter-VPC access: inbound and outbound traffic statistics between VPCs

Item	Description
Log Audit	You can check the following types of logs: ● Attack event logs, which contain details about intrusions ● Access control logs, which contain details about what access is allowed and what is blocked ● Traffic logs, which contain the access traffic of specific services You can use Huawei Cloud Log Tank Service (LTS) to record all CFW logs, including attack event, access control, and traffic logs.
System Management	● Alarm notification: You can use CFW to set notifications for attack logs and traffic threshold-crossing warnings. After the alarm notification function is enabled, IPS attack logs and traffic threshold-crossing warnings will be sent through emails or SMS messages. ● Network packet capture: Helps you locate network faults and attacks. ● DNS configuration: The DNS server resolves and delivers IP addresses. ● Security report: Generates log reports to help you learn about the security status of assets in a timely manner.

Table 3-2 Engine

Engine	Function	Protocol	Scenario
Firewall engine	The load balancing component distributes user traffic to the tenant firewall engine for security check and protection, and then sends the traffic to the target ECS. This engine provides various detection functions and flexible blocking policies.	TCP, UDP, ICMP, and Any	Protection for the border of Internet and VPC

4 Application Scenarios

External Intrusion Prevention

You can use CFW to perform security stocktaking on service assets accessible to the public network and enable intrusion detection and prevention in one click.

Control Over Server Originated Traffic

Implement domain-based precise control over server originated traffic.

Inter-VPC Access Control (Available in Professional Edition)

Check inter-VPC traffic and control internal access.

5 Editions

CFW provides the standard edition, and the professional edition. You can use access control, intrusion prevention, traffic analysis, and log audit functions on the console.

For details about the functions, see **Features**. For details about the differences, see **Editions**.

Table 5-1 Editions

Edition	Billing Mode	Protected Object	Description
Basic edition	Yearly/ Monthly	EIP	- Provides refined access control policy configuration for EIPs. - Meets log query requirements.
Standard edition	Yearly/ Monthly	EIP	- Meets graded protection requirements. - Provides network security protection to defend against network intrusions and server compromises.
Professional edition	- Pay-per-use - Yearly/ Monthly	- EIP - VPC	- Meets graded protection or key event assurance requirements. - Provides network security protection to defend against network intrusions and server compromises, and control the accesses between internal networks.

Table 5-2 Editions

Feature		Standard	Professional (Yearly/ Monthly)	Professional (Pay-per-Use)
Protected object	IPv4	√	√	√
	IPv6	×	×	×
Protection specifications	Protected EIPs	20 (can be increased to 2000)	50 (can be increased to 2000)	1000 (upper limit)
	Protected VPCs	×	2 (can be increased to 500)	20 (upper limit)
	Internet Border Protection Bandwidth	10 Mbit/s (can be increased to 2000 Mbit/s)	50 Mbit/s (can be increased to 2000 Mbit/s)	1 Gbps
	VPC Border Protection Bandwidth	×	200 Mbit/s (can be increased with the number of VPCs)	
Access traffic control	ACL access control for public network assets (based on IP addresses, domain names, domain groups, and geographical locations)	√	√	√
	North-south traffic protection and cloud resource (such as EIP) protection against risks on the Internet	√	√	√
	North-south traffic audit and log query	√	√	√
	East-west traffic protection, asset protection between VPCs, and full traffic analysis	×	√	√

Feature		Standard	Professional (Yearly/ Monthly)	Professional (Pay-per-Use)
	East-west traffic monitoring to obtain inter-VPC traffic data in real time	×	√	√
Protection policies	Intrusion prevention system (IPS)	√	√	√
	Custom IPS signature database	×	√	√
	Virtual patching	√	√	√
	Sensitive directories and reverse shells	√	√	√
	Antivirus	×	√	√

NOTE

Description:

- √: The function is included in the current edition.
- x: The function is not included in the current edition.

6 Billing

CFW can be billed in yearly/monthly (prepaid) or pay-per-use mode. For details, see **Pricing**.

Billing Items

CFW (yearly/monthly) is billed based on the edition, service duration, and specifications you purchase. If you select the pay-per-use billing mode, you will be charged based on the actual protection status.

Table 6-1 CFW billing

Edition	Billing Mode	Billing Item	Billing
Standard	Yearly/ Monthly	Required Duration	Billed on a yearly or monthly basis
		(Optional) Protected EIPs	Billed based on the purchased quantity
		(Optional) Peak Protection Traffic at Internet Boundary	Billed based on the purchased traffic
Professional	Pay-per-use	Usage duration	Billed for what you use

Billing Mode

- Yearly/Monthly: The longer the subscription duration, the lower the price. In yearly/monthly mode, you are billed based on the purchase period specified in the order.
- Pay-per-use: You are charged from the time when CFW is enabled to the time when CFW is disabled. If you enable the pay-per-use billing mode, you are

billed for the number of protected IP addresses, peak traffic, and number of VPCs.

Renewal

- After your yearly/monthly edition expires, there is a retention period for you.

  This period varies depending on your account. For details, see **Retention Period**.
- You can go to the management console to renew your subscription. For details, see **Renewal Management**.

7 Permissions Management

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

With IAM, you can use your Huawei Cloud account to create IAM users for your employees, and assign permissions to the users to control their access to specific resource types. For example, if you have software developers and you want to assign them the permission to access CFW but not to delete CFW or its resources, then you can create an IAM policy to assign the developers the permission to access CFW but prevent them from deleting CFW related data.

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

IAM can be used free of charge. You pay only for the resources in your account. For more information about IAM, see **What Is IAM?**

CFW Permissions

By default, new IAM users do not have any permissions assigned. To assign permissions to these new users, you need add them to one or more groups, and attach permission policies or roles to these groups. Users inherit permissions from the groups to which they are added and can perform specified operations on cloud services.

CFW is a project-level service deployed and accessed in specific physical regions. To assign permissions to a user group, specify the scope as region-specific projects and select projects for the permissions to take effect. If **All projects** is selected, the permissions will take effect for the user group in all region-specific projects. When accessing CFW, the users need to switch to a region where they have been authorized to use cloud services.

You can grant users permissions by using roles and policies.

- Roles: a type of coarse-grained authorization mechanism that defines service-level permissions based on user responsibilities. There are only a limited number of roles for granting permissions to users. If one role has a dependency role required for accessing CFW, assign both roles to the users.

Roles are not an ideal choice for fine-grained authorization and secure access control.

- Policies: Policy-based permission management is a type of fine-grained authorization mechanism that grants permissions to perform operations on specific cloud resources. This mechanism allows for more flexible policy-based authorization and secure access control. For example, you can grant HSS users only the permissions for managing a certain type of resources.

Table 7-1 describes the system roles of CFW.

Table 7-1 System policies supported by CFW

Role Name	Description	Category	Dependency
CFW FullAccess	All permissions for CFW	System-defined policy	None
CFW ReadOnlyAccess	Read-only permissions for CFW	System-defined policy	None

CFW FullAccess Policy Content

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "cfw:*:*",
                "vpc:publicIps:list",
                "vpc:publicipTags:get",
                "vpc:vpcs:create",
                "vpc:vpcs:list",
                "vpc:vpcs:get",
                "vpc:subnets:get",
                "vpc:subnets:create",
                "vpc:routeTables:list",
                "vpc:routeTables:update",
                "vpc:quotas:list",
                "er:instances:list",
                "er:attachments:list",
                "er:attachments:create",
                "er:routeTables:list",
                "er:routes:list",
                "er:associations:list",
                "er:instances:get",
                "ecs:cloudServers:list",
                "ecs:availabilityZones:list",
                "smn:topic:list",
                "nat:natGateways:list",
                "lts:groups:list",
                "lts:topics:get",
                "dcaas:vgw:list",
                "eps:resources:list",
                "tms:predefineTags:list"
            ],
            "Effect": "Allow"
        }
    ]
}
```

CFW ReadOnlyAccess Policy Content

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "cfw:*:list",
                "cfw:*:get",
                "vpc:publicIps:list",
                "vpc:publicipTags:get",
                "vpc:vpcs:list",
                "vpc:vpcs:get",
                "vpc:subnets:get",
                "vpc:routeTables:list",
                "vpc:quotas:list",
                "er:instances:list",
                "er:attachments:list",
               "er:routeTables:list",
               "er:routeTables:list",
               "er:routes:list",
               "er:associations:list",
               "er:instances:get",
                "ecs:cloudServers:list",
                "ecs:availabilityZones:list",
                "smn:topic:list",
                "nat:natGateways:list",
                "lts:groups:list",
                "lts:topics:get",
                "dcaas:vgw:list",
                "eps:resources:list",
                "tms:predefineTags:list"
            ],
            "Effect": "Allow"
        }
    ]
}
```

8 Constraints and Limitations

This topic describes some limitations and constraints on using CFW.

CFW Usage Restrictions

- Only the services deployed on Huawei Cloud can be protected. Cross-cloud access is not supported.
- Traffic protection supports EIPs, but does not support global EIPs or the EIPs bound to API Gateway.
- CFW can be used only in the region where it was purchased. To use CFW in another region, switch to that region and purchase it. For details about the regions where CFW is available, see **Function Overview**.

Protection Policy Quota Limit

- Protection rules

  A maximum of 20,000 protection rules can be added to a firewall instance.
- Blacklist/Whitelist
  - A maximum of 2000 blacklist items can be added to a firewall instance.
  - A maximum of 2000 whitelist items can be added to a firewall instance.
- Groups
  - IP address groups
    - A firewall instance can contain up to 3800 IP address groups.
    - An IP address group can contain up to 640 IP addresses.
    - A firewall instance can contain up to 30,000 IP addresses.
  - Service groups
    - A firewall instance can have up to 900 services.
    - A firewall instance can have up to 512 service groups.
    - A service group can have up to 64 services.
  - Domain name groups

        - The domain names in a domain name group can be referenced by protection rules for up to 40,000 times, and wildcard domain names can be referenced for up to 2,000 times.
        - **URL Filtering (Layer 7 Protocol Parsing)**
            - A firewall instance can have up to 500 domain name groups.
            - A firewall instance can have up to 2,500 domain names.
            - A domain name group in URL filtering mode can have up to 1,500 domain names.
        - **Address Resolution (Layer 4 Protocol Parsing)**
            - A firewall instance can have up to 1,000 domain names.
            - A DNS resolution domain name group can have up to 15 domain names.
            - Each domain name group can resolve up to 1,500 IP addresses.
            - Each domain name can resolve up to 1,000 IP addresses.

Restrictions on Basic IPS

- Modifying the action of a basic protection rule
    - The actions of up to 3000 rules can be manually changed to observation.
    - The actions of up to 3000 rules can be manually changed to interception.
    - The actions of up to 128 rules can be manually changed to disabling.
- Custom IPS signature
    - Only the professional edition supports custom IPS signatures.
    - A maximum of 500 features can be added.

Restrictions on Logs

- CFW allows you to view log data of the last seven days. One or multiple types of logs can be recorded in LTS. You can view log data in the past 1 to 360 days.
- Up to 100,000 records can be exported for a single log at a time.

9 Related Services

Identity and Access Management (IAM)

Identity and Access Management (IAM) provides the permission management function for CFW. Only users who have Tenant Administrator permissions can perform operations such as authorizing, managing, and detect cloud assets using CFW. To obtain the permissions, contact the users who have the Security Administrator permissions.

Cloud Trace Service (CTS)

Cloud Trace Service (CTS) generates traces to enable you to get a history of operations performed on CFW, allowing you to query, audit, and backtrack resource operation requests initiated from the management console as well as the responses to those requests.

CTS records operations related to CFW, facilitating your further queries, audits, and retrievals.

Cloud Eye

Cloud Eye provides a comprehensive monitoring platform for resources such as the ECS and bandwidth. Cloud Eye monitors the metrics of CFW, so that you can understand the protection status of CFW in a timely manner, and set protection policies accordingly.

Log Tank Service (LTS)

Log Tank Service (LTS) collects log data from servers and cloud services. CFW can record attack event logs, access control logs, and traffic logs to LTS, enabling real-time, efficient, and secure log processing.

Simple Message Notification (SMN)

Simple Message Notification (SMN) provides the message notification function. After you enable notification on CFW, you will receive alarms based on the notification mode you configured if your resources are attacked or the protection traffic exceeds your quota.

Enterprise Management

You can manage multiple projects in an enterprise, separately settle their costs, and assign them to different personnel. A project can be started or stopped independently without affecting others. With **Enterprise Management**, you can easily manage your projects after creating an enterprise project for each of them.

CFW can be interconnected with Enterprise Management. You can manage CFW resources by enterprise project and grant different permissions to users.

Differences from WAF

CFW and WAF are two different Huawei Cloud products that can be used to protect your Internet borders, VPC borders, and web services.

The following table describes the differences between CFW and WAF.

Table 9-1 Differences between CFW and WAF

Item	CFW	WAF
Definition	Cloud Firewall (CFW) is a next-generation cloud-native firewall. It protects the Internet border and VPC border on the cloud by real-time intrusion detection and prevention, global unified access control, full traffic analysis, log audit, and tracing. It employs AI for intelligent defense, and can be elastically scaled to meet changing business needs, helping you easily handle security threats. CFW is a basic service that provides network security protection for user services on the cloud.	WAF keeps web services stable and secure. It examines all HTTP and HTTPS requests to detect and block the following attacks: Structured Query Language (SQL) injection, cross-site scripting (XSS), web shells, command and code injections, file inclusion, sensitive file access, third-party vulnerability exploits, Challenge Collapsar (CC) attacks, malicious crawlers, and cross-site request forgery (CSRF). For details about WAF, see **What Is Web Application Firewall?**
Protection	• EIP border and VPC border • Basic protection against web attacks • Defense against external intrusions and protection of proactive connections to external systems	• WAF protects web applications on Huawei Cloud and other clouds and on-premises applications through domain names or IP addresses. • Comprehensive protection against web attacks

Item	CFW	WAF
Features	● Asset management and intrusion defense: It detects and defends against intrusions into cloud assets that are accessible over the Internet in real time. ● Access control: You can control access at Internet borders. ● Traffic Analysis and log audit: CFW controls, analyzes, and visualizes VPC traffic, audits logs, and traces traffic sources.	WAF identifies and blocks a wide range of suspicious attacks, such as SQL injections, XSS attacks, web shell upload, command or code injections, file inclusion, unauthorized sensitive file access, third-party vulnerability exploits, CC attacks, malicious crawlers, and CSRF.

10 Basic Concepts

5-tuple

A 5-tuple (or quintuple) consists of a source IP address, a destination IP address, a protocol, a source port, and a destination port.

Protected Traffic

Inbound traffic is the traffic transferred from the Internet to CFW. For example, the traffic for downloading resources from the public network to servers in the cloud is the inbound traffic.

Outbound traffic is the traffic transferred from CFW to the Internet. For example, servers on the cloud provide services for external users, the traffic used by external users for downloading resources from the cloud is outbound traffic.

Protection bandwidth: bandwidth of all services protected by CFW.

Protected bandwidth at the Internet border: the maximum inbound or outbound traffic of all EIPs protected by CFW.

Protected bandwidth at the VPC border: the maximum total traffic of all VPCs protected by CFW.

Internet Border Firewall

An Internet border firewall is used to detect north-south traffic. It supports intrusion detection and prevention (IPS) and network antivirus based on EIPs.

VPC Border Firewall

A VPC border firewall is used to detect communication traffic between two VPCs (east-west traffic), visualizing and protecting internal access activities.

IPS

An intrusion prevention system (IPS) is located between a firewall and a network device. It blocks attacks from suspicious communications before they are spread to other network devices.

Antivirus

The anti-virus function identifies and processes virus files through virus feature detection to prevent data damage, permission change, and system breakdown.

Internet Access

Internet access refers to the access from Internet IP addresses to cloud servers. Internet access protection helps you defend against intrusions from the outside in a timely manner.

Server Originated Access

Server originated access refers to the behavior that a cloud server proactively accesses an external IP address. Server originated access protection helps you manage and control outbound access behaviors.

VPC Peering Connection

A VPC peering connection is a networking connection between two VPCs using private IP addresses as if they were in the same VPC. In the same resource pool, you can create a VPC peering connection between your own VPCs, or with a VPC of another tenant. However, you cannot create a VPC peering connection between VPCs in different resource pools.

CFW-associated Subnet

This is a parameter that can be configured for a VPC border firewall. After a CIDR block is configured, a CFW-associated subnet is automatically allocated to forward traffic from the firewall to an enterprise router.

CVE ID

A Common Vulnerabilities and Exposures (CVE) ID is the unique identifier of a vulnerability.

CVE is a list of security vulnerabilities. Each entry in the list has a unique CVE ID.

Inspection VPC

An inspection VPC is used for a VPC border firewall to divert traffic. After a CIDR block is configured, CFW creates an inspection VPC by default. In VPC mode, the traffic destined for a service VPC is diverted by the inspection VPC to the firewall. .

The options are as follows:

- **Website filtering**: Layer 7 protocol parsing. Websites are matched based on domain names. HTTP/HTTPS is supported.
- **DNS resolution**: Layer 4 protocol parsing. Domain names are filtered based on resolved IP addresses. TCP, UDP, and ICMP are supported.