Hillstone Networks, Inc.

StoneOS WebUI Guide - CloudEdge

Version 5.5R5

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About this Guide:

This guide gives you comprehensive configuration instructions of Hillstone Networks, Inc. StoneOS .

For more information, refer to the documentation site: http://docs.hillstonenet.com.

To provide feedback on the documentation, please write to us at:

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Hillstone Networks, Inc.

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Welcome

Thanks for choosing Hillstone products!

This part introduces how you get user guides of Hillstone products.

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Cookbook (recipes):

- StoneOS 5.5 Cookbook (Download PDF)

OS Operation Guides:

- StoneOS Command Line Interface User Guide (Download PDF)
- StoneOS WebUI User Guide (Download PDF)
- StoneOS Log Messages Reference Guide (Download PDF)
- StoneOS SNMP Private MIB Reference Guide (Download PDF)
- StoneOS Addendum Book for P Releases (Download PDF)

Hardware Installation Guides:

- Hardware Reference Guide of all series platforms (Download PDF)
- Expansion Modules Reference Guide of all modules (Download PDF)

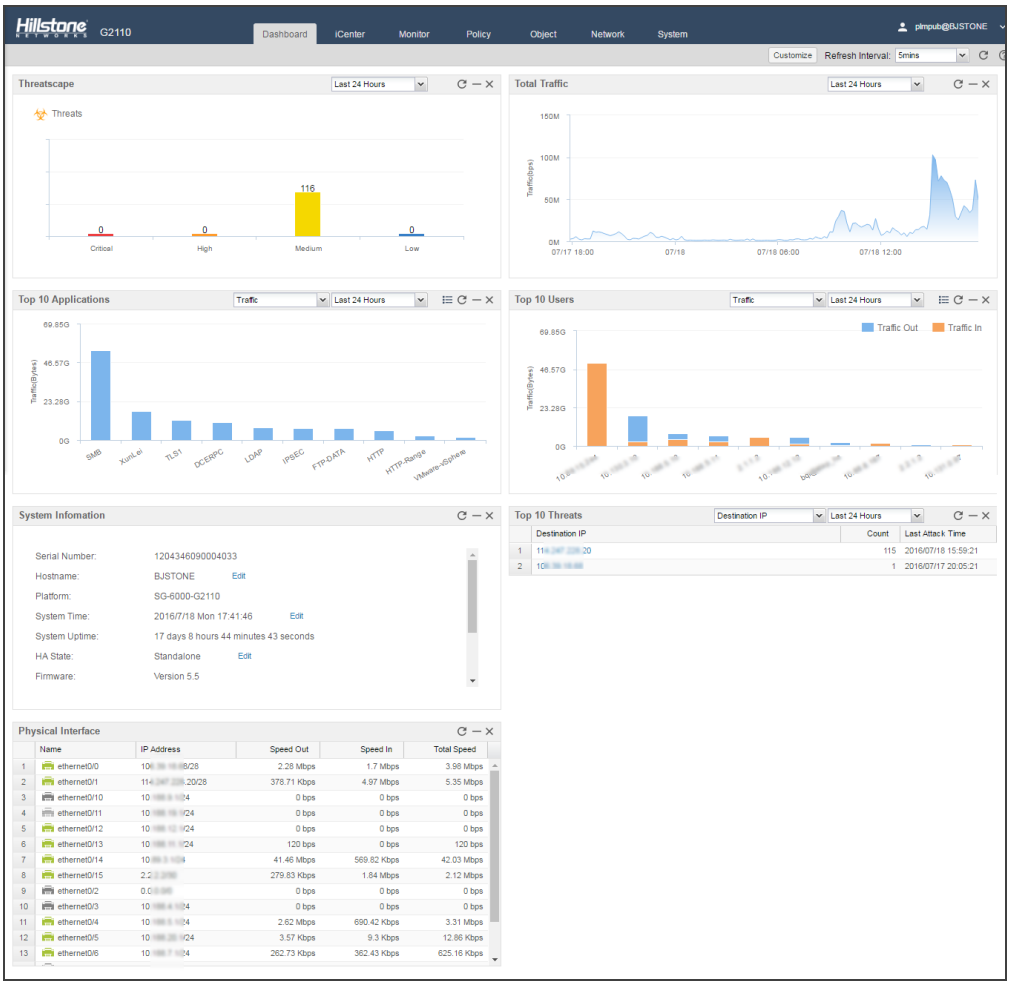
Other Support Links:

- Webiste: www.hillstonenet.com
- Download Documentations:http://docs.hillstonenet.com
- Technical Support: 1-800-889-9860

Chapter 1 Dashboard

This feature may vary slightly on different platforms. If there is a conflict between this guide and the actual page, the latter shall prevail.

The dashboard shows the system and threat information. The layout of the dashboard is shown below:



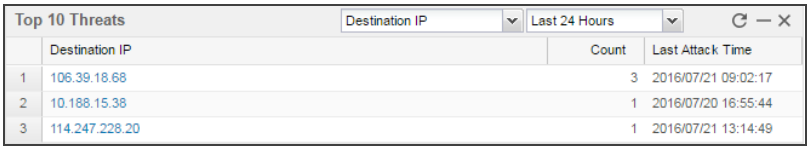
Customize

You can customize the dashboard display function or modify the function area location as needed.

- To customize the dashboard display function:
  1. Click **Customize** at the top-right corner.
  2. Select the function check box from the expanded list.
- To modify the function area location:
  1. Hover your mouse over the title part in the ribbon.
  2. When appears, press and hold the mouse functional area , the regional location to be displayed .

Threats

Display the top 10 threats information within the specified period.

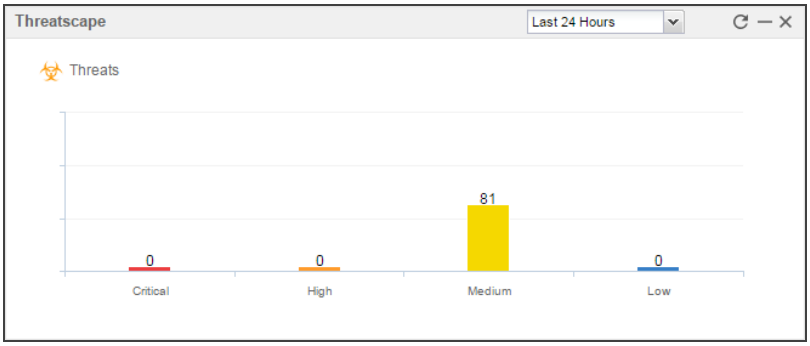


- Click 

to specify the type of display: Destination IP, Source IP or Threat Name.

Threatscape

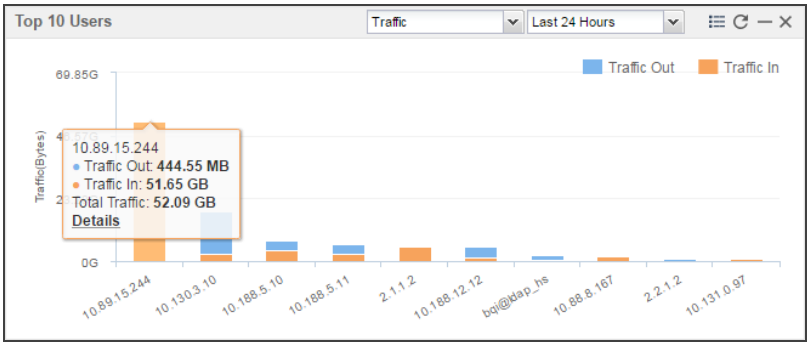
The threat information statistic chart is displayed within the specified period.



- Click the column to jump to the iCenter page, and the list will display the corresponding threat level.

User

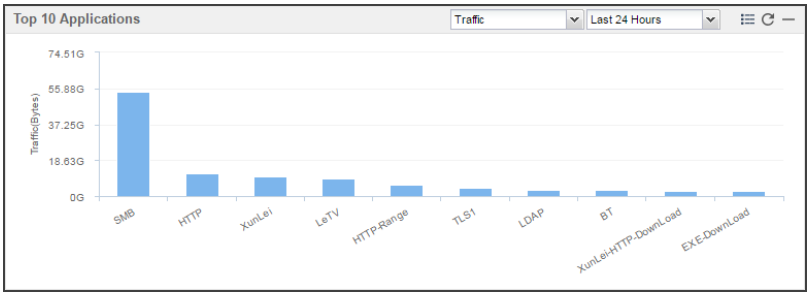
Display the top 10 user traffic information within the specified period.



- Specify the type of display: by Traffic or by Concurrent Sessions from the drop-down menu.
- Click  and  , switch between the table and the bar chart.
- Hover your mouse over a bar, to view users' upstream traffic, downstream traffic, total traffic or concurrent sessions.

Application

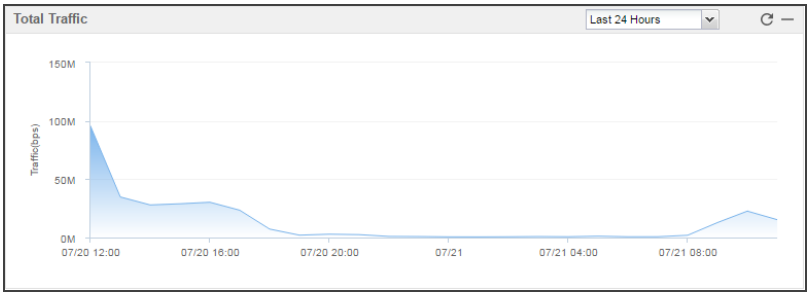
Display the top 10 application traffic information within the specified period.



- Specify the type of display: by Traffic or by New Sessions from the drop-down menu.
- Click and , switch between the table and the bar chart.
- Hover your mouse over a bar, to view users' total traffic or new sessions.

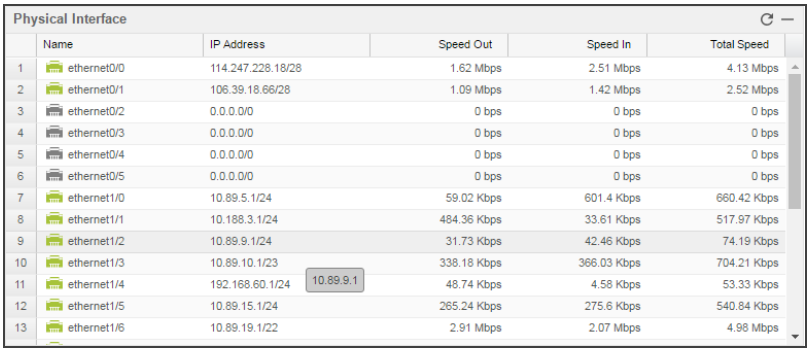
Total Traffic

Show the Total Traffic within the specified period .



Physical Interface

Display the statistical information of interfaces, including the interface name, IP address, upstream speed, down-stream speed, and total speed.



System Information

System information include.

- Serial number: The serial number of the device.
- Host name: The host name of the device.
- Platform: The platform type of the device.
- System Time: The time of system.

- System Uptime: The running time of system.
- HA State: The HA State of device:
  - Standalone: Non-HA mode which represents HA is disabled.
  - Init: Initial state.
  - Hello: Negotiation state which represents the device is negotiating the relationship between master and backup.
  - Master: Master state which represents current device is master.
  - Backup: Backup state which represents current device is backup.
  - Failed: Fault state which represents the device is failed.
- Firmware:The version number and version time of the firmware running on the device.
- Boot File: The boot file name.
- Anti Virus Signature: The version number and time of the anti virus signature database.
- IPS Signature: The version number and time of the IPS signature database.
- URL Category Database: The version number and time of the URL category database.
- Application Signature: The version number and time of the application signature database.
- IP Reputation Database: The version number and time of the IP reputation database.

Specified Period

System supports the predefined time cycle and the custom time cycle. Click (

) on the top right corner of each tab to set the time cycle.

- Realtime: Display the statistical information within 5 minutes of the current time.
- Last Hour: Display the statistical information within the latest 1 hour.
- Last Day: Display the statistical information within the latest 1 day.
- Last Week: Display the statistical information within the latest 1 week.
- Last Month: Display the statistical information within the latest 1 month.
- Custom: Customize the time cycle. Select **Custom** and the **Custom Date and Time** dialog. Select the start time and the end time as needed.

In the top-right corner, you can set the refresh interface of the displayed data.

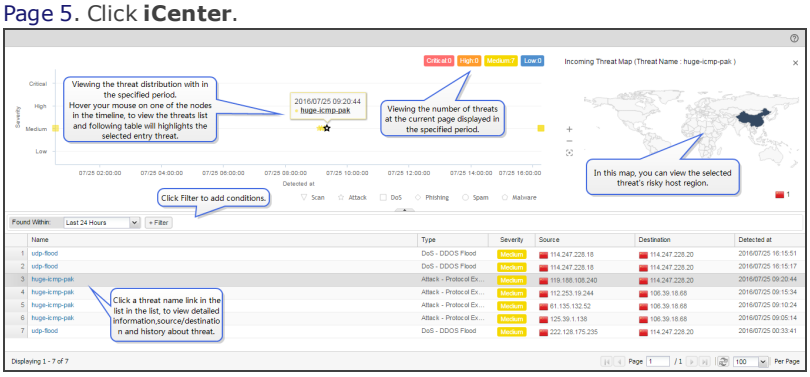
Chapter 2 iCenter

This feature may not be available on all platforms. Please check actual page in system to see whether your device delivers this feature.

The multi-dimensional features show threats to the whole network in depth. threats of the whole network.

Threat

Threats tab statistics and displays the all threats information of the whole network within the "Specified Period" on Page 5. Click **iCenter**.



Click a threat name link in the list to view the detailed information , source/destination, knowledge base and history about the threat.

- Threat Analysis: Depending on the threats of the different detection engine , the content of Threat Analysis tab is also different.
  - **Anti Virus/IPS**: Display the detailed threat information .

    For the IPS function introduction, see /" Intrusion Prevention System" on Page 342.
  - **Attack Defense/Perimeter Traffic Filtering**: Display the threat detailed information.

    For the Attack Defense/Perimeter Traffic Filtering function introduction, see "Attack-Defense" on Page 365/"Perimeter Traffic Filtering" on Page 374.
  - **Sandbox Threat Detection**: Display the detailed threat information of the suspicious file.

    For the Sandbox function, see "Sandbox" on Page 360.
- Knowledge Base: Display the specified threat description, solution, etc. of the threats detected by IPS .
- Threat History: Display the selected threat historical information of the whole network .

Creating a White List

To create a threat white list, take the following steps:

1. Click **iCenter**, and select **Threat** tab.
2. Select the threat entries that need to be added to the white list, and click the threat name link in the list to open the **Threat** dialog.
3. Clickto open the **Admin Analysis** dialog.
4. Click **Create White List** button.

In the Threat White List Configuration dialog , enter the configurations

Option	Description
Threat Name	Specify the white list name. Click threat name, select the name in the drop-down list, which can be used as a threat name or **any** to whitelist name.
Source Address	Specify the white list source address to be matched. Click Source Address, select the source address of selected threat event or **any** in the drop-down list.
Destination Address	Specify the white list destination address to be matched. Click Destination Address, select the source address of selected threat event or **any** in the drop-down list.

5. Click **OK**.

Viewing the White List

To view the threat white list entries, take the following steps:

1. Click **iCenter**.
2. Click **Whitelist Management** tab.

The information of white list

Option	Description
Threat Name	Displays the threat name of white list.
Source Address	Displays the source address of white list.
Destination Address	Displays the destination address of white list.
Detected by	Displays the detection engine.
Hit Count	Displays the hit count of white list entry.
Last Detection Time	Displays the last detection time of hit the threat white list.
Status	Displays the status of white list entry. indicates the status is enable , indicates the status is disable.

Chapter 3 Network

This chapter describes factors and configurations related to network connection, including:

- Security Zone: The security zone divides the network into different section, such as the trust zone and the untrust zone. The device can control the traffic flow from and to security zones once the configured policy rules have been applied.
- Interface: The interface allows inbound and outbound traffic flow to security zones. An interface must be bound to a security zone so that traffic can flow into and from the security zone.
- DNS: Domain Name System.
- DHCP: Dynamic Host Configuration Protocol.
- DDNS: Dynamic Domain Name Server.
- PPPoE: Point-to-Point Protocol over Ethernet.
- Virtual-Wire: The virtual wire allows direct Layer 2 communications between sub networks.
- Virtual Switch: Running on Layer 2, VSwitch acts as a switch. Once a Layer 2 security zone is bound to a VSwitch, all the interfaces bound to that zone will also be bound to the VSwitch.
- Link Load Balancing: It takes advantage of dynamic link detection technique to assign traffic to different links appropriately, thus making full use of all available link resources.
- Application Layer Gate: ALG can assure the data transmission for the applications that use multiple channels and assure the proper operation of VoIP applications in the strictest NAT mode.
- Global Network Parameters: These parameters mainly include the IP packet's processing options, like IP fragmentation, TCP MSS value, etc.

Security Zone

Security zone is a logical entity. One or more interfaces can be bound to one zone. A zone applied with a policy is known as a security zone, while a zone created for a specific function is known as a functional zone. Zones have the following features:

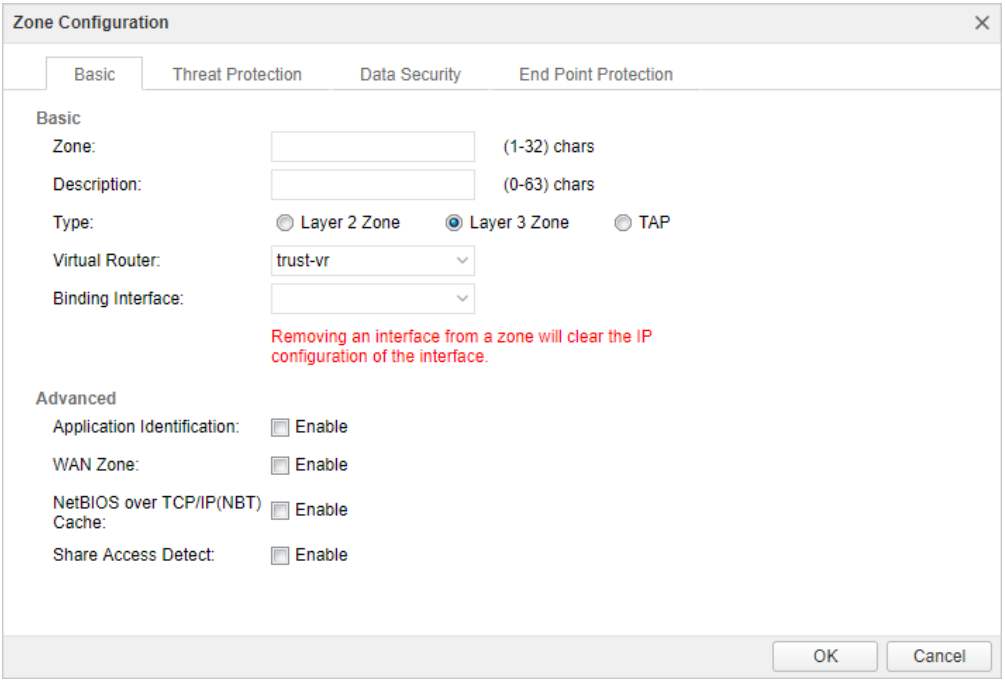
- An interface should be bound to a zone. A Layer 2 zone will be bound to a VSwitch, while a Layer 3 zone will be bound to a VRouter. Therefore, the VSwitch to which a Layer 2 zone is bound decides which VSwitch the interfaces belong to in that Layer 2 zone, and the VRouter to which a Layer 3 zone is bound decides which VRouter the interfaces belong to in that Layer 3 zone.
- Interfaces in Layer 2 and Layer 3 are working in Layer 2 mode and Layer 3 mode respectively.
- System supports internal zone policies, like trust-to-trust policy rule.

There are 8 pre-defined security zones in StoneOS, which are trust, untrust, dmz, L2-trust, L2-untrust, L2-dmz, vpn-hub (VPN functional zone) and ha (HA functional zone). You can also customize security zones. Pre-defined security zones and user-defined security zones have no difference in functions, so you can make your choice freely.

Configuring a Security Zone

To create a security zone, take the following steps:

1. Select **Network > Zone**.
2. Click **New**.



3. In the Zone Configuration text box, type the name of the zone into the Zone box.
4. Type the descriptions of the zone in the Description text box.
5. Specify a type for the security zone. For a Layer 2 zone, select a VSwitch for the zone from the VSwitch drop-down list below; for a Layer-3 zone, select a VRouter from the Virtual Router drop-down list. If TAP is selected, the zone created is a tap zone, which is used in Bypass mode.
6. Bind interfaces to the zone. Select an interface from the Binding Interface drop-down list.
7. If needed, select the **Enable** check box to enable APP identification for the zone.

8. If needed, select the **Enable** check box to set the zone to a WAN zone, assuring the accuracy of the statistic analysis sets that are based on IP data.
9. If needed, select the **Enable** check box to enable NetBIOS host query for the zone. For detailed instructions, see "DNS" on Page 39.
10. If needed, select the **Enable** check box to enable share access detect for the zone. It is a share access detect method based on the application characteristic, which is used to detect the users' private behavior of shared access to Internet. For detailed instructions, see "Share Access Detect" on Page 393.
11. If needed, select Threat Protection tab and configure the parameters for Threat Protection function. For detailed instructions, see "Chapter 9 Threat Prevention" on Page 335.
12. If needed, select Data Security tab and configure the parameters for Data Security function. For detailed instructions, see "Data Security" on Page 248.
13. If needed, select End Point Protection tab and configure the parameters for End Point Protection function. For detailed instructions, see"End Point Protection" on Page 275.
14. Click **OK**.

Note:

- Pre-defined zones cannot be deleted.
- When changing the VSwitch to which a zone belong, make sure there is no binding interface in the zone.

Interface

Interfaces allow inbound and outbound traffic to flow to security zones. An interface must be bound to a security zone so that traffic can flow into and from the security zone. Furthermore, for the Layer 3 security zone, an IP address should be configured for the interface, and the corresponding policy rules should also be configured to allow traffic transmission between different security zones. Multiple interfaces can be bound to one security zone, but one interface cannot be bound to multiple security zones.

The security devices support various types of interfaces which are basically divided into physical and logical interfaces based on the nature.

- Physical Interface: Each Ethernet interface on devices represents a physical interface. The name of a physical interface, consisting of media type, slot number and location parameter, is pre-defined, like ethernet2/1 or ethernet0/2.
- Logical Interface: Include sub-interface, VSwitch interface, loopback interface, tunnel interface, aggregate interface, redundant interface, PPPoE interface and Virtual Forward interface.

Interfaces can also be divided into Layer 2 interface and Layer 3 interface based on their security zones.

- Layer 2 Interface: Any interface in Layer 2 zone.
- Layer 3 Interface: Any interface in Layer 3 zone. Only Layer 3 interfaces can operate in NAT/routing mode.

Different types of interfaces provide different functions, as described in the table below.

Type	Description
Sub-interface	The name of an sub-interface is an extension to the name of its original interface, like ethernet0/2.1. System supports the following types of sub-interfaces: Ethernet sub-interface, aggregate sub-interface and redundant sub-interface. An interface and its sub-interfaces can be bound to one single security zone, or to different zones.
VSwitch interface	A Layer 3 interface that represents the collection of all the interfaces of a VSwitch. The VSwtich interface is virtually the upstream interface of a switch that implements packet forwarding between Layer 2 and Layer 3.
Loopback interface	A logical interface. If only the security device with loopback interface configured is in the working state, the interface will be in the working state as well. Therefore, the loopback interface is featured with stability.
Tunnel interface	Only a Layer 3 interface, the tunnel interface acts as an ingress for VPN communications. Traffic flows into VPN tunnel through this interface.
Aggregate interface	Collection of physical interfaces that include 1 to 16 physical interfaces. These interfaces averagely share the traffic load to the IP address of the aggregate interface, in an attempt to increase the available bandwidth for a single IP address. If one of the physical interfaces within an aggregate interface fails, other physical interfaces can still process the traffic normally. The only effect is the available bandwidth will decrease.
Redundant interface	The redundant interface allows backup between two physical interfaces. One physical interface, acting as the primary interface, processes the inbound traffic, and another interface, acting as the alternative interface, will take over the processing if the primary interface fails.
PPPoE interface	A logical interface based on Ethernet interface that allows connection to PPPoE servers over PPPoE protocol.
Virtual Forward interface	In HA environment, the Virtual Forward interface is HA group's interface designed for traffic transmission.

Configuring an Interface

The configuration options for different types of interfaces may vary. For more information, see the following instructions.

Both IPv4 and IPv6 address can be configured for the interface, but IPv6 address is not supported for the PPPoE interface.

Creating a PPPoE Interface

To create a PPPoE interface, take the following steps:

1. Select **Network > Interface**.
2. Click **New > PPPoE Interface**.

In the Basic tab, configure the following.

Option	Description
Interface Name	Specifies a name for the PPPoE interface.
Description	Enter descriptions for the PPPoE interface.
Binding Zone	If Layer 3 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, the interface will not bind to any zone.
Zone	Select a security zone from the Zone drop-down list.
HA sync	Select this check box to enable the HA Sync function, which disables Local property and uses the virtual MAC, and the primary device will synchronize its information with the backup device; not selecting this check box disables the HA Sync function, which enables Local property and uses the original MAC, and the primary device will not synchronize its information with the backup device.
User	Specifies a username for PPPoE.
Password	Specifies PPPoE user's password.
Confirm password	Enter the password again to confirm.
Idle interval	If the PPPoE interface has been idle (no traffic) for a certain period, i.e. the specified idle interval, system will disconnect the Internet connections; if the interface requires Internet access, the system will connect to the Internet automatically. The value range is 0 to 10000 minutes. The default value is 30.
Re-connect interval	Specifies a re-connect interval (i.e., system will try to re-connect automatically after being disconnected for the interval). The value range is 0 to 10000 seconds. The default value is 0, which means the function is disabled.
Set gateway information from PPPoE server as the default gateway route	With this selected checkbox, system will set the gateway information provided by PPPoE server as the default gateway route.
Advanced	In the Advanced dialog, configure advanced options for PPPoE, includ-

Option	Description
	ing: • Access concentrator - Specifies a name for the concentrator. • Authentication - The devices will have to pass PPPoE authentication when trying to connect to a PPPoE server. The supported authentication methods include CHAP, PAP and Any (the default, anyone between CHAP and PAP). • Netmask - Specifies a netmask for the IP address obtained via PPPoE. • Static IP - You can specify a static IP address and negotiate about using this address to avoid IP change. To specify a static IP address, type it into the box. • Distance - Specifies a route distance. The value range is 1 to 255. The default value is 1. • Weight - Specifies a route weight. The value range is 1 to 255. The default value is 1. • Service - Specifies allowed service. The specified service must be the same with that provided by the PPPoE server. If no service is specified, system will accept any service returned from the server automatically.
DDNS	In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Force to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface, the reverse data stream will be returned to its original route without any reverse route check. That is to say, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that sends reverse packets.
WAP Traffic Distribution	Select the **Enable** check box and configure as follows: • Destination IP Replacement: Select the **Enable** check box, and specify the logs you need to record. If All is selected in WAP Log Record section, system will record all the traffic logs; while if Destination IP Replacement radio button is selected, system will record logs for the translated traffic. • Destination Service Port 1/Destination Service Port 2: Specifies the HTTP port number for the WAP gateway.
Proactive	Select the **Enable** check box to enable proactive webauth function and

Option	Description
WebAuth	Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and password in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

In the Properties tab, configure properties for the interface.

Option	Description
MTU	Specifies a MTU for the interface. The value range is 1280 to 1500/1800 bytes. The default value is 1500. The max MTU may vary on different Hillstone platforms.
ARP Learning	Select the **Enable** checkbox to enable ARP learning.
ARP Timeout	Specifies an ARP timeout for the interface. The value range is 5 to 65535 seconds. The default value is 1200.
Keep-alive IP	Specifies an IP address that receives the interface's keep-alive packets.
MAC clone	Select the **MAC clone** check box to enable the MAC clone function. System clones a MAC address in the Ethernet sub-interface. If the user click "Restore Default MAC", the Ethernet sub-interface will restore the default MAC address.
Mirror	Enable port mirroring on an Ethernet interface, and select the traffic type to be mirrored.

In the Advanced tab, configure advanced options for the interface.

Option	Description
Shutdown	System supports interface shutdown. You can not only force a specific interface to shut down, but also control the time it shuts down by schedule or according to the link status of tracked objects. Configure the options as below: 1. Select the **Shut down** check box to enable interface shutdown. 2. To control the shutdown by schedule or tracked objects, select the appropriate check box, and then select an appropriate schedule or tracked object from the drop-down list.
Monitor and Backup	Configure the options as below: 1. Select the appropriate check box, and then select an appropriate schedule or tracked object from the drop-down list. 2. Select an action: • Shut down the interface: During the time specified in the schedule, or when the tracked object fails, the interface will be shut down and its related route will fail;

Option	Description
	• Migrate traffic to backup interface: During the time specified in the schedule, or when the tracked object fails, traffic flowing to the interface will be migrated to the backup interface. In such a case you need to select a backup interface from the Backup interface drop-down list and type the time into the Migrating time box. (Migrating time, 0 to 60 minutes, is the period during which traffic is migrated to the backup interface before the primary interface is switched to the backup interface. During the migrating time, traffic is migrated from the primary interface to the backup interface smoothly. By default the migrating time is set to 0, i.e., all the traffic will be migrated to the backup interface immediately.)

In the RIP tab, configure RIP for the interface.

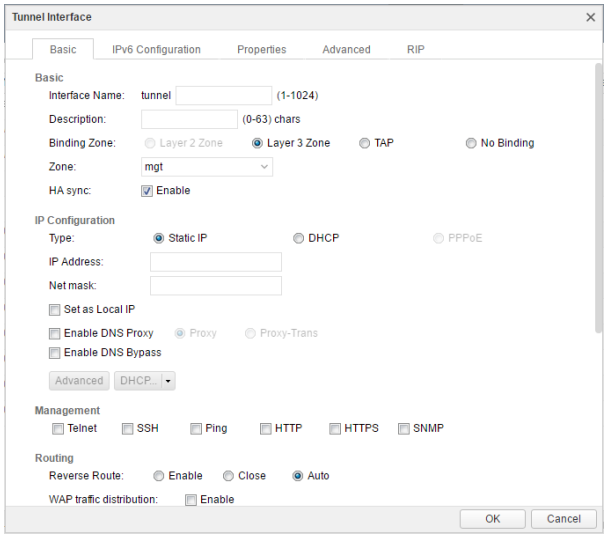
Option	Description
Authentication mode	Specifies a packet authentication mode for the system, including plain text (the default) and MD5. The plain text authentication, during which unencrypted string is transmitted together with the RIP packet, cannot assure security, so it cannot be applied to the scenarios that require high security.
Authentication string	Specifies a RIP authentication string for the interface.
Transmit version	Specifies a RIP information version number transmitted by the interface. By default V1&V2 RIP information will be transmitted.
Receive version	Specifies a RIP information version number transmitted by the interface. By default V1&V2 RIP information will be transmitted.
Split horizon	Select the **Enable** checkbox to enable split horizon. With this function enabled, routes learned from an interface will not be sent from the same interface, in order to avoid routing loop and assure correct broadcasting to some extent.

3. Click **OK**.

Creating a Tunnel Interface

To create a tunnel interface:

1. Select **Network > Interface**.
2. Select **New > Tunnel Interface**.



In the Basic tab, configure the following.

Option	Description
Interface Name	Specifies a name for the tunnel interface.
Description	Enter descriptions for the tunnel interface.
Binding Zone	If Layer 3 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, the interface will not bind to any zone.
Zone	Select a security zone from the Zone drop-down list.
HA sync	Select this check box to enable the HA Sync function, which disables Local property and uses the virtual MAC, and the primary device will synchronize its information with the backup device; not selecting this check box disables the HA Sync function, which enables Local property and uses the original MAC, and the primary device will not synchronize its information with the backup device.
IP Configuration	

Option	Description
Static IP	IP address: Specifies an IP address for the interface.
	Netmask: Specifies a netmask for the interface.
	Set as Local IP: In an HA environment, if this option is specified, the interface IP will not synchronize to the HA peer.
	Enable DNS Proxy: Select this check box to enable DNS proxy for the interface. • When the general DNS proxy is in use, the client in the network will still get DNS replies from the DNS server configured on itself. If the DNS server address is configured as an interface address of Hillstone device, the device will work as a DNS server; • When the transparent DNS proxy is in use, the Hillstone device will reply all DNS requests. In such a case, there is no need to edit DNS configuration on each client. DNS service can be easily controlled by modifying the device's DNS configuration.
	Enable DNS Bypass: Select this check box to enable DNS bypass for the interface.
	Advanced: • Management IP: Specifies a management IP for the interface. Type the IP address into the box. • Secondary IP: Specifies secondary IPs for the interface. You can specify up to 6 secondary IP addresses.
	DHCP: In the DHCP Configuration dialog, configure DHCP options for the interface. For detailed instructions, see "DHCP" on Page 43.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Auto-obtain	Set gateway information from DHCP server as the default gateway route: With this check box selected, system will set the gateway information provided by the DHCP server as the default gateway route.
	Advanced: • Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1. • Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. • Management Priority: Specifies a priority for the DNS server. Except for static DNS servers, system can also learn DNS servers dynamically via DHCP or PPPoE. Therefore, you need to configure priorities for the DNS servers, so that system can choose a DNS server according to its priority during DNS resolution. The priority is represented in numbers from 1 to 255. The larger the number is, the higher the priority is. The priority of static DNS servers is 20. • Classless Static Routes: Enable the classless static routing function via the DHCP options. When it is enabled, the DHCP client will send a request message with the Option121 (i.e., classless static routing option) to the server, and then the server will return the classless static route information. Finally, the client will add the classless static routing information to the routing table.

Option	Description
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Enforces to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface, the reverse data stream will be returned to its original route without any reverse route check. That is, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that sends reverse packets.
Tunnel Binding	Bind the interface to a IPSec VPN tunnel or a SSL VPN tunnel. One tunnel interface can be bound to multiple IPSec VPN tunnels, while only to one SSL VPN tunnel. • IPSec VPN: Select IPSec VPN radio button. Specifies a name for the IPSec VPN tunnel that is bound to the interface. Then select a next-hop address for the tunnel, which can either be the IP address or the egress IP address of the peering tunnel interface. This parameter, which is 0.0.0.0 by default, will only be valid when multiple IPSec VPN tunnels is bound to the tunnel interface. • SSL VPN: Select SSL VPN radio button. Specifies a name for the SSL VPN tunnel that is bound to the interface.
Proactive WebAuth	Select the **Enable** check box to enable proactive webauth function and Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and password in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

3. **In the IPv6 Configuration tab, configure the following.**

Option	Description
Enable	Enable IPv6 in the interface.
IPv6 Address	Specifies the IPv6 address prefix.
Prefix Length	Specifies the prefix length.
Autoconfig	Select the checkbox to enable Auto-config function. In the address auto-config mode, the interface receives the address prefix in RA packets first, and then combines it with the interface identifier to generate a global

Option	Description
	address. • Set Default Route - If the interface is configured with a default router, this option will generate a default route to the default router.
Advanced	
Static	Click Add button to add several IPv6 address, at most 5 IPv6 addresses.. Click Delete button to delete IPv6 address.
Dynamic	Shows IPv6 address which is dynamic.
Link-local	Specifies link-local address. Link-local address is used for communication between adjacent nodes of a single link. For example, communication between hosts when there are no routers on the link. By default system will generate a link-local address for the interface automatically if the interface is enabled with IPv6 (in the interface configuration mode, use the command ipv6 enable). You can also specify a link-local address for the interface as needed, and the specified link-local address will replace the automatically generated one.
MTU	Specifies an IPv6 MTU for an interface.
DAD Attempts	Specifies NS packet attempt times. The value range is 0 to 20. Value 0 indicates DAD is not enabled on the interface. If system does not receive any NA response packets after sending NS packets for the attempt times, it will verify that the IPv6 address is an unique available address. DAD (Duplicate Address Detection) is designed to verify the uniqueness of IPv6 addresses. This function is implemented by sending NS (Neighbor Solicitation) requests. After receiving a NS packet, if any other host on the link finds that the address of the NS requester is duplicated, it will send a NA (Neighbor Advertisement) packet advertising that the address is already in use, and then the NS requester will mark the address as duplicate, indicating that the address is an invalid IPv6 address.
ND Interval	Specifies an interval for sending NS packets.
ND Reachable Time	Specifies reachable time. After sending an NS packet, if the interface receives acknowledgment from a neighbor within the specified time, it will consider the neighbor as reachable. This time is known as reachable time.
Hop Limit	Specifies the hop limit. Hop limit refers to the maximum number of hops for IPv6 or RA packets sent by the interface.
ND RA Suppress	Select the checkbox to disable RA suppress on LAN interfaces. By default, FDDI interface configured with IPv6 unicast route will send RA packets automatically, and interfaces of other types will not send RA packets.
Manage IP/MASK	Specifies the manage IP/MASK.

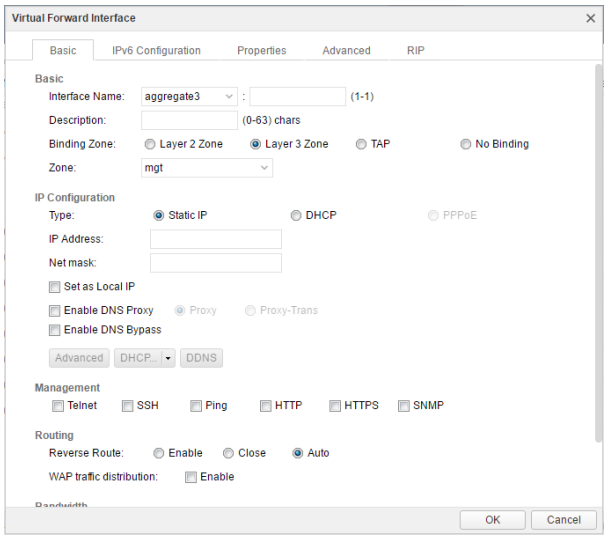
4. "In the Properties tab, configure properties for the interface." on Page 14
5. "In the Advanced tab, configure advanced options for the interface." on Page 14
6. "In the RIP tab, configure RIP for the interface." on Page 15
7. Click **OK**.

Creating a Virtual Forward Interface

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

To create a virtual forward interface, take the following steps:

1. Select **Network > Interface**.
2. Select **New > Virtual Forward Interface**.



In the Basic tab, configure the following.

Option	Description
Interface Name	Specifies a name for the virtual forward interface.
Description	Enter descriptions for the virtual forward interface.
Binding Zone	If Layer 3 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, the interface will not bind to any zone.
Zone	Select a security zone from the Zone drop-down list.
IP Configuration	

Option	Description
Static IP	IP address: Specifies an IP address for the interface.
	Netmask: Specifies a netmask for the interface.
	Set as Local IP: In an HA environment, if this option is specified, the interface IP will not synchronize to the HA peer.
	Enable DNS Proxy: Select this check box to enable DNS proxy for the interface. • When the general DNS proxy is in use, the client in the network will still get DNS replies from the DNS server configured on itself. If the DNS server address is configured as an interface address of Hillstone device, the device will work as a DNS server; • When the transparent DNS proxy is in use, all DNS requests will be replied by the Hillstone device. In such a case, there is no need to edit DNS configuration on each client. DNS service can be easily controlled by modifying the device's DNS configuration.
	Enable DNS Bypass: Select this check box to enable DNS bypass for the interface.
	Advanced: • Management IP: Specifies a management IP for the interface. Type the IP address into the box. • Secondary IP: Specifies secondary IPs for the interface. You can specify up to 6 secondary IP addresses.
	DHCP: In the DHCP Configuration dialog, configure DHCP options for the interface. For detailed instructions, see "DHCP" on Page 43.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Auto-obtain	Set gateway information from DHCP server as the default gateway route: With this check box selected, system will set the gateway information provided by the DHCP server as the default gateway route.
	Advanced: • Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1. • Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. • Management Priority: Specifies a priority for the DNS server. Except for static DNS servers, system can also learn DNS servers dynamically via DHCP or PPPoE. Therefore, you need to configure priorities for the DNS servers, so that system can choose a DNS server according to its priority during DNS resolution. The priority is represented in numbers from 1 to 255. The larger the number is, the higher the priority is. The priority of static DNS servers is 20. • Classless Static Routes: Enable the classless static routing function via the DHCP options. When it is enabled, the DHCP client will send a request message with the Option121 (i.e., classless static routing option) to the server, and then the server will return the classless static route information. Finally, the client will add the classless static routing information to the routing table.

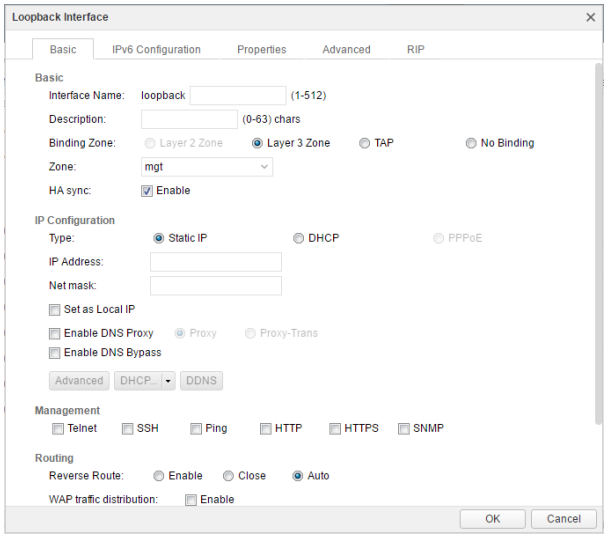
Option	Description
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Enforces to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface, the reverse data stream will be returned to its original route without any reverse route check. That is, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that sends reverse packets.
WAP Traffic Distribution	Select the **Enable** check box and configure as follows: • Destination IP Replacement: Select the **Enable** check box, and specify the logs you need to record. If All is selected in WAP Log Record section, system will record all the traffic logs; while if Destination IP Replacement radio button is selected, system will record logs for the translated traffic. • Destination Service Port 1/Destination Service Port 2: Specifies the HTTP port number for the WAP gateway.
Proactive WebAuth	Select the **Enable** check box to enable proactive webauth function and Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and password in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

3. "In the IPv6 Configuration tab, configure the following." on Page 18
4. "In the Properties tab, configure properties for the interface." on Page 14
5. "In the Advanced tab, configure advanced options for the interface." on Page 14
6. "In the RIP tab, configure RIP for the interface." on Page 15
7. Click **OK**.

Creating a Loopback Interface

To create a loopback interface, take the following steps:

1. Select **Network > Interface**.
2. Click **New > Loopback Interface**.



In the Basic tab, configure the following.

Option	Description
Interface Name	Specifies a name for the loopback interface.
Description	Enter descriptions for the loopback interface.
Binding Zone	If Layer 3 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, the interface will not bind to any zone.
Zone	Select a security zone from the Zone drop-down list.
HA sync	Select this check box to enable the HA Sync function, which disables Local property and uses the virtual MAC, and the primary device will synchronize its information with the backup device; not selecting this check box disables the HA Sync function, which enables Local property and uses the original MAC, and the primary device will not synchronize its information with the backup device.
IP Configuration	

Option	Description
Static IP	IP address: Specifies an IP address for the interface.
	Netmask: Specifies a netmask for the interface.
	Set as Local IP:In an HA environment, if this option is specified, the interface IP will not synchronize to the HA peer.
	Enable DNS Proxy: Select this check box to enable DNS proxy for the interface. • When the general DNS proxy is in use, the client in the network will still get DNS replies from the DNS server configured on itself. If the DNS server address is configured as an interface address of Hillstone device, the device will work as a DNS server; • When the transparent DNS proxy is in use, all DNS requests will be replied by the Hillstone device. In such a case, there is no need to edit DNS configuration on each client. DNS service can be easily controlled by modifying the device's DNS configuration.
	Enable DNS Bypass: Select this check box to enable DNS bypass for the interface.
	Advanced: • Management IP: Specifies a management IP for the interface. Type the IP address into the box. • Secondary IP: Specifies secondary IPs for the interface. You can specify up to 6 secondary IP addresses.
	DHCP: In the DHCP Configuration dialog, configure DHCP options for the interface. For detailed instructions, see "DHCP" on Page 43.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Auto-obtain	Set gateway information from DHCP server as the default gateway route: With this check box selected, system will set the gateway information provided by the DHCP server as the default gateway route.
	Advanced: • Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1. • Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. • Management Priority: Specifies a priority for the DNS server. Except for static DNS servers, system can also learn DNS servers dynamically via DHCP or PPPoE. Therefore, you need to configure priorities for the DNS servers, so that system can choose a DNS server according to its priority during DNS resolution. The priority is represented in numbers from 1 to 255. The larger the number is, the higher the priority is. The priority of static DNS servers is 20. • Classless Static Routes: Enable the classless static routing function via the DHCP options. When it is enabled, the DHCP client will send a request message with the Option121 (i.e., classless static routing option) to the server, and then the server will return the classless static route information. Finally, the client will add the classless static routing information to the routing table.

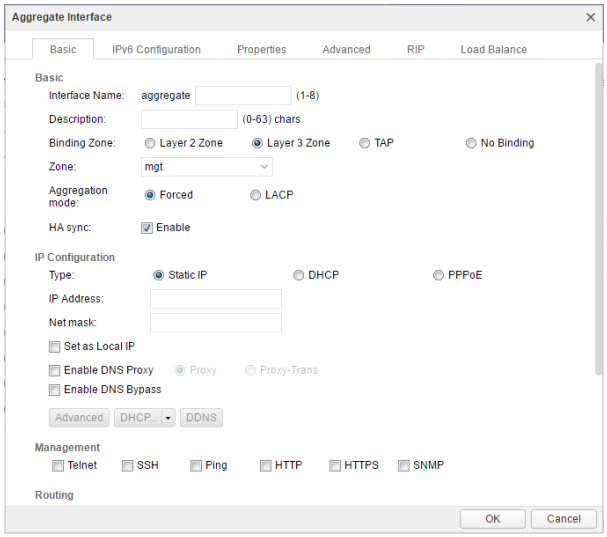
Option	Description
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Enforces to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface, the reverse data stream will be returned to its original route without any reverse route check. That is, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that sends reverse packets.
Proactive WebAuth	Select the **Enable** check box to enable proactive webauth function and Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and password in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

3. "In the IPv6 Configuration tab, configure the following." on Page 18
4. "In the Properties tab, configure properties for the interface." on Page 14
5. "In the Advanced tab, configure advanced options for the interface." on Page 14
6. "In the RIP tab, configure RIP for the interface." on Page 15
7. Click **OK**.

Creating an Aggregate Interface

To create an aggregate interface, take the following steps：

1. Select **Network > Interface**.
2. Click **New > Aggregate Interface**.



3. **In the Basic tab, configure the following.**

Option	Description
Interface Name	Specifies a name for the aggregate interface.
Description	Enter descriptions for the aggregate interface.
Binding Zone	Specifies the zone type. If Layer 3 or Layer 2 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 or Layer 2 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, you should also select a aggregate interface/redundant interface: Belong to: Description Aggregate Interface: The interface you specified belongs to an aggregate interface. Choose an aggregate interface which the aggregate interface belongs to from the Interface Group drop-down list. Redundant Interface: This interface belongs to a redundant interface. Select that redundant interface from the Interface Group drop-down list. None: This interface does not belong to any object.
Zone	Select a security zone from the Zone drop-down list.
LACP	• Forced: Aggregates multiple physical interfaces to form an aggregate interface. These physical interfaces will share the traffic passing through the aggregate interface equally. • Enables LACP on the interface to negotiate aggregate interfaces dynamically. LACP options are: • System priority: Specifies the LACP system priority. The value range is 1 to 32768, the default value is 32768. This parameter is used to assure the interfaces of two ends are consistent. System will select interfaces based on the end with higher LACP system priority. The smaller the value is, the higher the priority will be. If the LACP system priorities of the two ends are equal, system

Option	Description
	will compare MACs of the two ends. The smaller the MAC is, the higher the priority will be. • Max bundle: Specifies the maximum active interfaces. The value range is 1 to 16, the default value is 16. When the active interfaces reach the maximum number, the status of other legal interfaces will change to Standby. • Min bundle: Specifies the minimum active interfaces. The value range is 1 to 8, the default value is 1. When the active interfaces reach the minimum number, the status of all the legal interfaces in the aggregation group will change to Standby automatically and will not forward any traffic.
HA sync	Select this check box to enable HA sync function. The primary device will synchronize its information with the backup device.
IP Configuration	
Static IP	IP address: Specifies an IP address for the interface.
	Netmask: Specifies a netmask for the interface.
	Set as Local IP: In an HA environment, if this option is specified, the interface IP will not synchronize to the HA peer.
	Enable DNS Proxy: Select this check box to enable DNS proxy for the interface. • When the general DNS proxy is in use, the client in the network will still get DNS replies from the DNS server configured on itself. If the DNS server address is configured as an interface address of Hillstone device, the device will work as a DNS server; • When the transparent DNS proxy is in use, all DNS requests will be replied by the Hillstone device. In such a case, there is no need to edit DNS configuration on each client. DNS service can be easily controlled by modifying the device's DNS configuration.
	Enable DNS Bypass: Select this check box to enable DNS bypass for the interface.
	Advanced: • Management IP: Specifies a management IP for the interface. Type the IP address into the box. • Secondary IP: Specifies secondary IPs for the interface. You can specify up to 6 secondary IP addresses.
	DHCP: In the DHCP Configuration dialog, configure DHCP options for the interface. For detailed instructions, see "DHCP" on Page 43.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Auto-obtain	Set gateway information from DHCP server as the default gateway route: With this check box being selected, system will set the gateway information provided by the DHCP server as the default gateway route.
	Advanced: • Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1.

Option	Description
	• Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. • Management Priority: Specifies a priority for the DNS server. Except for static DNS servers, system can also learn DNS servers dynamically via DHCP or PPPoE. Therefore, you need to configure priorities for the DNS servers, so that system can choose a DNS server according to its priority during DNS resolution. The priority is represented in numbers from 1 to 255. The larger the number is, the higher the priority is. The priority of static DNS servers is 20. • Classless Static Routes: Enable the classless static routing function via the DHCP options. When it is enabled, the DHCP client will send a request message with the Option121 (i.e., classless static routing option) to the server, and then the server will return the classless static route information. Finally, the client will add the classless static routing information to the routing table.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
PPPoE	Obtain IP through PPPoE。Configure the following options： • User - Specifies a username for PPPoE. • Password - Specifies PPPoE user's password. • Confirm password - Enter the password again to confirm. • Idle interval - If the PPPoE interface has been idle (no traffic) for a certain period, i.e., the specified idle interval, the system will disconnect the Internet connection; if the interface requires Internet access, the system will connect to the Internet automatically. The value range is 0 to 10000 minutes. The default value is 30. • Re-connect interval - Specifies a re-connect interval (i.e., system will try to re-connect automatically after being disconnected for the interval). The value range is 0 to 10000 seconds. The default value is 0, which means the function is disabled. • Set gateway information from PPPoE server as the default gateway route - With this checkbox selected, system will set the gateway information provided by PPPoE server as the default gateway route.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Enforces to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface the reverse data stream will be returned to its original route without any reverse route check. That is, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that

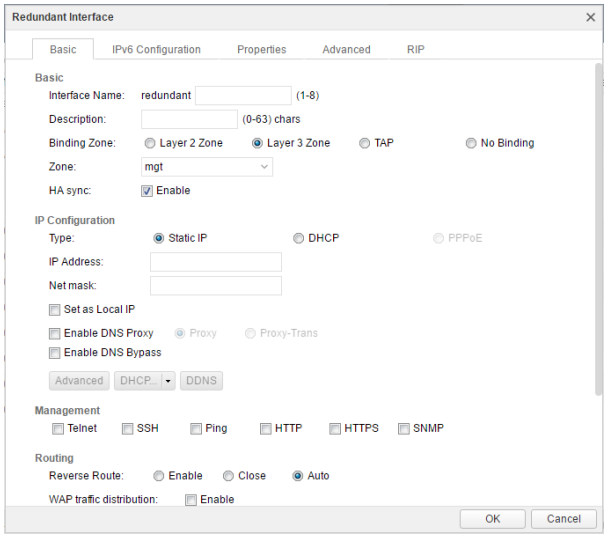
Option	Description
	sends reverse packets.
WAP Traffic Distribution	Select the **Enable** check box and configure as follows: • Destination IP Replacement: Select the **Enable** check box, and specify the logs you need to record. If All is selected in WAP Log Record section, system will record all the traffic logs; while if Destination IP Replacement radio button is selected, system will record logs for the translated traffic. • Destination Service Port 1/Destination Service Port 2: Specifies the HTTP port number for the WAP gateway.
Proactive WebAuth	Select the **Enable** check box to enable proactive webauth function and Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and password in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

4. "In the IPv6 Configuration tab, configure the following." on Page 18
5. "In the Properties tab, configure properties for the interface." on Page 14
6. "In the Advanced tab, configure advanced options for the interface." on Page 14
7. "In the RIP tab, configure RIP for the interface." on Page 15
8. In the Load Balance tab, configure a load balance mode for the interface. "Flow-based" means enabling automatic load balance based on the flow. This is the default mode. "Tuple" means enabling load based on the source/destination IP, source/destination MAC, source/destination interface or protocol type of packet, or the combination of the selected items.
9. Click **OK**.

Creating a Redundant Interface

To create a redundant interface, take the following steps:

1. Select **Network > Interface**.
2. Click **New > Redundant Interface**.



3. "In the Basic tab, configure the following." on Page 26
4. "In the IPv6 Configuration tab, configure the following." on Page 18
5. "In the Properties tab, configure properties for the interface." on Page 14
6. "In the Advanced tab, configure advanced options for the interface." on Page 14
7. "In the RIP tab, configure RIP for the interface." on Page 15
8. Click **OK**.

Creating an Ethernet Sub-interface/an Aggregate Sub-interface/a Redundant Sub-interface

To create an ethernet sub-interface/an aggregate sub-interface/a redundant sub-interface, take the following steps:

1. Select **Network > Interface**.
2. Click **New > Ethernet Sub-interface/Aggregate Sub-interface/Redundant Sub-interface**.
3. **In the Basic tab, configure the following.**

Option	Description
Interface Name	Specifies a name for the virtual forward interface.
Description	Enter descriptions for the virtual forward interface.
Binding Zone	If Layer 3 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, the interface will not bind to any zone.
Zone	Select a security zone from the Zone drop-down list.
IP Configuration	

Option	Description
Static IP	IP address: Specifies an IP address for the interface.
	Netmask: Specifies a netmask for the interface.
	Set as Local IP: In an HA environment, if this option is specified, the interface IP will not synchronize to the HA peer.
	Enable DNS Proxy: Select this check box to enable DNS proxy for the interface. • When the general DNS proxy is in use, the client in the network will still get DNS replies from the DNS server configured on itself. If the DNS server address is configured as an interface address of Hillstone device, the device will work as a DNS server; • When the transparent DNS proxy is in use, all DNS requests will be replied by the Hillstone device. In such a case, there is no need to edit DNS configuration on each client. DNS service can be easily controlled by modifying the device's DNS configuration.
	Enable DNS Bypass: Select this check box to enable DNS bypass for the interface.
	Advanced: • Management IP: Specifies a management IP for the interface. Type the IP address into the box. • Secondary IP: Specifies secondary IPs for the interface. You can specify up to 6 secondary IP addresses.
	DHCP: In the DHCP Configuration dialog, configure DHCP options for the interface. For detailed instructions, see "DHCP" on Page 43.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Auto-obtain	Set gateway information from DHCP server as the default gateway route: With this check box selected, system will set the gateway information provided by the DHCP server as the default gateway route.
	Advanced: • Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1. • Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. • Management Priority: Specifies a priority for the DNS server. Except for static DNS servers, system can also learn DNS servers dynamically via DHCP or PPPoE. Therefore, you need to configure priorities for the DNS servers, so that the system can choose a DNS server according to its priority during DNS resolution. The priority is represented in numbers from 1 to 255. The larger the number is, the higher the priority is. The priority of static DNS servers is 20. • Classless Static Routes: Enable the classless static routing function via the DHCP options. When it is enabled, the DHCP client will send a request message with the Option121 (i.e., classless static routing option) to the server, and then the server will return the classless static route information. Finally, the client will add the classless static routing information to the routing table.

Option	Description
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
PPPoE	Obtain IP through PPPoE。Configure the following options：(Effective only when creating a aggregate sub-interface) • User - Specifies a username for PPPoE. • Password - Specifies PPPoE user's password. • Confirm password - Enter the password again to confirm. • Idle interval -If the PPPoE interface has been idle (no traffic) for a certain period, i.e., the specified idle interval, system will disconnect the Internet connection; if the interface requires Internet access, the system will connect to the Internet automatically. The value range is 0 to 10000 minutes. The default value is 30. • Re-connect interval - Specifies a re-connect interval (i.e., system will try to re-connect automatically after being disconnected for the interval). The value range is 0 to 10000 seconds. The default value is 0, which means the function is disabled. • Set gateway information from PPPoE server as the default gateway route - With this checkbox selected, system will set the gateway information provided by PPPoE server as the default gateway route.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Enforces to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface the reverse data stream will be returned to its original route without any reverse route check. That is, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that sends reverse packets.
WAP Traffic Distribution	Select the **Enable** check box and configure as follows: • Destination IP Replacement: Select the **Enable** check box, and specify the logs you need to record. If All is selected in WAP Log Record section, system will record all the traffic logs; while if Destination IP Replacement radio button is selected, system will record logs for the translated traffic. • Destination Service Port 1/Destination Service Port 2: Specifies the HTTP port number for the WAP gateway.
Proactive WebAuth	Select the **Enable** check box to enable proactive webauth function and Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and pass-

Option	Description
	word in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

4. "In the IPv6 Configuration tab, configure the following." on Page 18
5. "In the Properties tab, configure properties for the interface." on Page 14
6. "In the Advanced tab, configure advanced options for the interface." on Page 14
7. "In the RIP tab, configure RIP for the interface." on Page 15
8. Click **OK**.

Creating a VSwitch Interface Interface

To create a VSwitch interface/a VLAN interface, take the following steps:

1. Select **Network > Interface**.
2. Click **New > VSwitch Interface Interface**.
3. "In the Basic tab, configure the following." on Page 20
4. "In the Properties tab, configure properties for the interface." on Page 14
5. "In the Advanced tab, configure advanced options for the interface." on Page 14
6. "In the RIP tab, configure RIP for the interface." on Page 15
7. Click **OK**.

Editing an Interface

To edit an interface, take the following steps:

1. Select **Network > Interface**.
2. Select the interface you want to edit from the interface list and click **Edit**.
3. **In the Basic tab, configure the following.**

Option	Description
Interface Name	Specifies a name for the interface.
Description	Enter descriptions for the interface.
Binding Zone	Specifies the zone type. If Layer 3 or Layer 2 zone is selected, you should also select a security zone from the Zone drop-down list, and the interface will bind to a Layer 3 or Layer 2 zone. If TAP is selected, the interface will bind to a tap zone. If No Binding is selected, you should also select a VLAN/aggregate interface/redundant interface:

Option	Description
	Belong to: Description Aggregate Interface: The interface you specified belongs to a aggregate interface. • Interface Group：Choose an aggregate interface which the aggregate interface belongs to from Interface Group drop-down list. • Port LACP priority： Port LACP priority determines the sequence of becoming the Selected status for the members in the aggregate group. The smaller the number is, the higher the priority will be. Link in the aggregate group that will be aggregated is determined by the interface LACP priority and the LACP system priority. • Port timeout mode： The LACP timeout refers to the time interval for the members The system supports **Fast** (1 second) and **Slow** (30 seconds, the default value).waiting to receive the LACPDU packets. If the local member does not receive the LACPDU packet from its peer in three timeout values, the peer will be conclude as down, and the status of the local member will change from Active to Selected, and stop traffic forwarding. Redundant Interface: This interface belongs to a redundant interface. Select that redundant interface from the Interface Group drop-down list. None: This interface does not belong to any object.

LACP	• Forced: Aggregates multiple physical interfaces to form an aggregate interface. These physical interfaces will share the traffic passing through the aggregate interface equally.
	• Enables LACP on the interface to negotiate aggregate interfaces dynamically. LACP options are:
	  • System priority: Specifies the LACP system priority. The value range is 1 to 32768, the default value is 32768. This parameter is used to assure the interfaces of two ends are consistent. System will select interfaces based on the end with higher LACP system priority. The smaller the value is, the higher the priority will be. If the LACP system priorities of the two ends are equal, system will compare MACs of the two ends. The smaller the MAC is, the higher the priority will be.
	  • Max bundle: Specifies the maximum active interfaces. The value range is 1 to 16, the default value is 16. When the active interfaces reach the maximum number, the status of other legal interfaces will change to Standby.
	  • Min bundle: Specifies the minimum active interfaces. The value range is 1 to 8, the default value is 1. When the active interfaces reach the minimum number, the status of all the legal interfaces in the aggregation group will change to Standby automatically and will not forward any traffic.

Option	Description
Zone	Select a security zone from the Zone drop-down list.
IP Configuration	
Static IP	IP address: Specifies an IP address for the interface.
	Netmask: Specifies a netmask for the interface.
	Set as Local IP: In an HA environment, if this option is specified, the interface IP will not synchronize to the HA peer.
	Enable DNS Proxy: Select this check box to enable DNS proxy for the interface. • When the general DNS proxy is in use, the client in the network still get DNS replies from the DNS server configured on itself. If the DNS server address is configured as an interface address of Hillstone device, the device will work as a DNS server; • When the transparent DNS proxy is in use, the Hillstone device will reply all DNS requests. In such a case, there is no need to edit DNS configuration on each client. DNS service can be easily controlled by modifying the device's DNS configuration.
	Enable DNS Bypass: Select this check box to enable DNS bypass for the interface.
	Advanced: • Management IP: Specifies a management IP for the interface. Type the IP address into the box. • Secondary IP: Specifies secondary IPs for the interface. You can specify up to 6 secondary IP addresses.
	DHCP: In the DHCP Configuration dialog, configure DHCP options for the interface. For detailed instructions, see "DHCP" on Page 43.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Auto-obtain	Set gateway information from DHCP server as the default gateway route: With this check box selected, system will set the gateway information provided by the DHCP server as the default gateway route.
	Advanced: • Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1. • Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. • Management Priority: Specifies a priority for the DNS server. Except for static DNS servers, system can also learn DNS servers dynamically via DHCP or PPPoE. Therefore, you need to configure priorities for the DNS servers, so that system can choose a DNS server according to its priority during DNS resolution. The priority is represented in numbers from 1 to 255. The larger the number is, the higher the priority is. The priority of static DNS servers is 20. • Classless Static Routes: Enable the classless static routing function via the DHCP options. When it is enabled, the DHCP client will send a request message with the Option121 (i.e., classless static

Option	Description
	routing option) to the server, and then the server will return the classless static route information. Finally, the client will add the classless static routing information to the routing table.
	DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
PPPoE	User: Specifies a username for PPPoE. Password: Specifies PPPoE user's password. Confirm Password: Enter the password again to confirm. Idle Interval: If the PPPoE interface has been idle (no traffic) for a certain period, i.e. the specified idle interval, system will disconnect the Internet connection; if the interface requires Internet access, system will connect to the Internet automatically. The value range is 0 to 10000 minutes. The default value is 30. Re-connect Interval: Specifies a re-connect interval (i.e., system will try to re-connect automatically after being disconnected for the interval). The value range is 0 to 10000 seconds. The default value is 0, which means the function is disabled. Set gateway information from PPPoE server as the default gateway route: With this check box being selected, system will set the gateway information provided by PPPoE server as the default gateway route. Advanced — Access concentrator: Specifies a name for the concentrator. Authentication: The devices will have to pass PPPoE authentication when trying to connect to a PPPoE server. The supported authentication methods include CHAP, PAP and Any (the default, anyone between CHAP and PAP). Click an authentication method. Netmask: Specifies a netmask for the IP address obtained via PPPoE. Static IP: You can specify a static IP address and negotiate to use this address to avoid IP change. To specify a static IP address, type it into the box. Service: Specifies allowed service. The specified service must be the same with that provided by the PPPoE server. If no service is specified, Hillstone will accept any service returned from the server automatically. Distance: Specifies a route distance. The value range is 1 to 255. The default value is 1. Weight: Specifies a route weight. The value range is 1 to 255. The default value is 1. DDNS: In the DDNS Configuration dialog, configure DDNS options for the interface. For detailed instructions, see "DDNS" on Page 48.
Management	Select one or more management method check boxes to configure the interface management method.
Reverse Route	Enable or Disable reverse route as needed: • Enable: Enforces to use a reverse route. If the reverse route is not available, packets will be dropped. This option is enabled by default. • Close: Reverse route will not be used. When reaching the interface, the reverse data stream will be returned to its original route without

Option	Description
	any reverse route check. That is, reverse packets will be sent from the ingress interface that initializes the packets. • Auto: Reverse route will be prioritized. If available, the reverse route will be used to send packets; otherwise the ingress interface that initializes the packets will be used as the egress interface that sends reverse packets.
WAP Traffic Distribution	Select the **Enable** check box and configure as follows: • Destination IP Replacement: Select the **Enable** check box, and specify the logs you need to record. If All is selected in WAP Log Record section, system will record all the traffic logs; while if Destination IP Replacement radio button is selected, system will record logs for the translated traffic. • Destination Service Port 1/Destination Service Port 2: Specifies the HTTP port number for the WAP gateway.
Proactive WebAuth	Select the **Enable** check box to enable proactive webauth function and Specify the AAA server. After enabling, you can access the Web authentication address initiate authentication request, and then fill in the correct user name and password in the authentication login page. The Web authentication address consists of the IP address of the interface and the port number of the HTTP/HTTPS of the authentication server. For example the IP address of the interface is 192.168.3.1, authentication server HTTP/HTTPS port numbe is respectively configured as 8182/44434. When the authentication server is configured for HTTP authentication mode, Web address is: http:// 192.168.3.1:8182; when the authentication server is configured for HTTPS mode, the Web address for the https:// 192.168.3.1:44434 certification.

4. "In the IPv6 Configuration tab, configure the following." on Page 18

5. **In the Properties tab, configure properties for the interface.**

Property	Description
MTU	Specifies a MTU for the interface. The value range is 1280 to 1500/1800 bytes. The default value is 1500. The max MTU may vary in different Hillstone models.
ARP Learning	Select the Enable checkbox to enable ARP learning.
ARP Timeout	Specifies an ARP timeout for the interface. The value range is 5 to 65535 seconds. The default value is 1200.
Keep-alive IP	Specifies an IP address that receives the interface's keep-alive packets.
MAC clone	Select the **MAC clone** check box to enable the MAC clone function. System clones a MAC address to the Ethernet sub-interface. If the user click "Restore Default MAC", the Ethernet sub-interface will restore the default MAC address.

6. "In the Advanced tab, configure advanced options for the interface." on Page 14
7. "In the RIP tab, configure RIP for the interface." on Page 15
8. Click **OK**.

Note:

- Before deleting an aggregate/redundant interface, you must cancel other interfaces' bindings to it, aggregate/redundant sub-interface's configuration, its IP address configuration and its binding to the security zone.
- An Ethernet interface can only be edited but cannot be deleted.
- When a VSwitch interface is deleted, the corresponding VSwitch will be deleted as well.

DNS

DNS, the abbreviation for Domain Name System, is a computer and network service naming system in form of domain hierarchy. DNS is designed for TCP/IP network to query for Internet domain names (e.g., www.xxxx.com) and translate them into IP addresses (e.g., 10.1.1.1) to locate related computers and services.

The security device's DNS provides the following functions:

- Server: Configures DNS servers and default domain names for the security device.
- Proxy: The security device acts as a DNS proxy server and provides proxy service for the connected PCs and other clients. Besides, the security device can also choose different DNS servers according to domain names.
- Analysis: Sets retry times and timeout for device's DNS service.
- Cache: DNS mappings to cache can speed up query. You can create, edit and delete DNS mappings.
- NBT Cache: Displays NBT cache information.

Configuring a DNS Server

You can configure a DNS server for system to implement DNS resolution. To create a DNS server, take the following steps:

1. Select **Network > DNS > DNS Server**.
2. Click **New** in the DNS Server section.
3. In the DNS Server Configuration dialog, type the IP address for the DNS server into the Server IP box.
4. Select a VRouter from the VR drop-down list. The default VRouter is trust-vr.
5. Select an interface from the Egress Interface drop-down list. This parameter is mainly used for multi-egress DNS agents. If the interface is only for this device's DNS, you can keep the default "---".
6. Click **OK**.

Configuring a DNS Proxy

To enable a DNS proxy, take the following steps:

1. Configure a DNS proxy list that contains domain names and corresponding DNS servers.
2. Enable DNS proxy on an interface of the device (For more details, see "Configuring an Interface" on Page 12).
3. Connect the client to the interface with DNS proxy enabled.

To create a DNS proxy, take the following steps:

1. Select **Network > DNS > DNS Proxy**.
2. Click **New** in the DNS Proxy section.
3. In the DNS Proxy Configuration dialog, specify a suffix for a domain name in the Domain Type section.
4. In the Domain Server section, specify a DNS server or servers. "Use system" means using the DNS server bundled with system."User-defined" means defining IP address for the server. Click **User-defined** and select a VRouter from the VR drop-down list, then type the IP address for the DNS servers into the boxes below (6 servers at most).
5. Click **OK**.

The multi-egress DNS proxy supports DNS management , which provides load balancing for the configured egress interfaces of DNS servers. Then system sends DNS request packets out from the egress interface with lower bandwidth utilization . Enable "DNS Balance Configuration" to activate this function. For detailed information, refer to Configuring outbound LLB.

Configuring an Analysis

Analysis configuration includes DNS requests' retry times and timeout.

- Retry: If there is no response from the DNS server after the timeout, system will send the request again; if there is still no response from the DNS server after the specified retry times (i.e. the number of times to repeat the DNS request), system will send the request to the next DNS server.
- Timeout: System will wait for the DNS server's response after sending the DNS request and will send the request again if no response returns after a specified time. The period of waiting for a response is known as timeout.

To configure the retry times and timeout for DNS requests, take the following steps:

1. Select **Network > DNS > Analysis**
2. Select the retry times radio button.
3. Select the timeout values radio button.
4. Type the value in the TTL text box to specify the survival time of the response message for the device's DNS.
5. Click **Apply**.

Configuring a DNS Cache

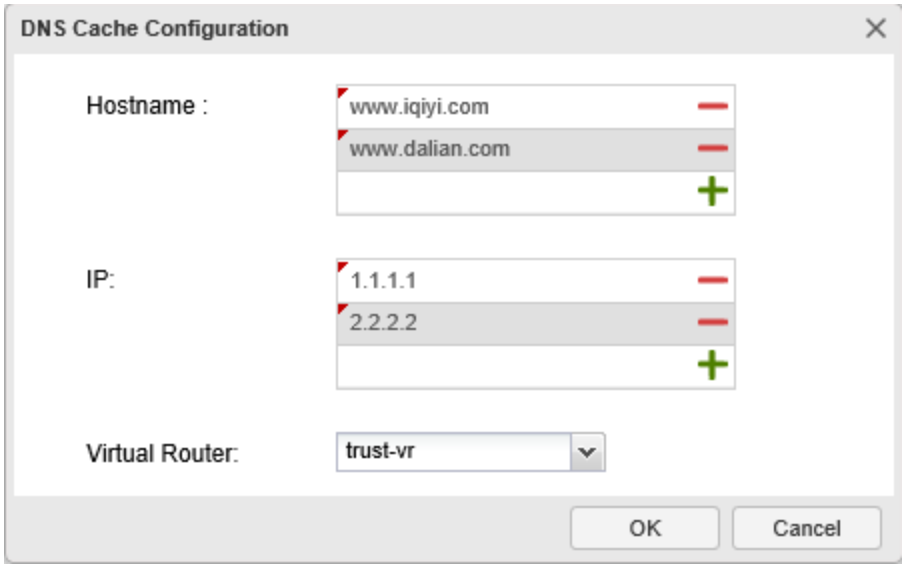
When using DNS, system might store the DNS mappings to its cache to speed up the query. There are three ways to obtain DNS mappings:

- Dynamic: Obtains from DNS response.
- Static: Adds DNS mappings to cache manually.
- Register: DNS hosts specified by some modules of security devices, such as NTP, AAA, etc.

For convenient management , DNS static cache supports group function, which means users make the multiple domain hosts with the same IP address and virtual router is a DNS static cache group.

To add a static DNS mapping to cache, take the following steps:

1. Select **Network > DNS > Cache**
2. Click **New**.



Option	Description
Hostname	Specify the hostname of a DNS cache group. You can click + to add or click − button to delete the specified hostname. The maximum number of domain hosts is 128, and the maximum length of each hostname is 255 characters.
IP	Specify the host IPv4 address of a DNS cache group. You can click + to add or click − button to delete the specified IP. The maximum number of host IP address is 8, and the earlier configured IP will be matched first.
Virtual Router	Select a VRouter.

3. Click **OK**.

Note:

- Only DNS static cache group can support new, edit and delete operation , while dynamic and register cache cannot .
- The DNS dynamic cache can be deleted by command or the lifetime reset. For detailed information , refer to **StoneOS CLI User Guide** and download PDF on website.
- User can clear the register cache only by deleting the defined hosts in function module.
- DNS static cache is superior to dynamic and register cache, which means the static cache will cover the same existed dynamic or register cache.

NBT Cache

System supports NetBIOS name resolution. With this function enabled, system can automatically obtain all the NetBIOS host names registered by the hosts within the managed network, and store them in the cache to provide IP address to NetBIOS host name query service for other modules.

Enabling a NetBIOS name resolver is the pre-requisition for displaying host names in NAT logs. For more information on how to display host names in the NAT logs, see "Log Configuration" on Page 439.

To enable NetBIOS for a zone, select the NBT cache check box when creating or editing the zone. For more details, see "Security Zone" on Page 9. The security zone with NetBIOS enabled should not be the zone that is connected to WAN. After NetBIOS is enabled, the query process might last for a while, and the query result will be added to the NetBIOS cache table. System will perform the query again periodically and update the result.

Note: Only when PCs have NetBIOS enabled can their host names be queried. For more information on how to enable NetBIOS, see the detailed instructions of your PC's Operating System.

To clear NBT cache, take the following steps:

1. Select **Network > DNS > NBT Cache**.
2. Select a VRouter from the VR drop-down list to display the NBT cache in that VRouter.
3. Select a NBT cache entry from the list and click **Delete**.

DHCP

DHCP, the abbreviation for Dynamic Host Configuration Protocol, is designed to allocate appropriate IP addresses and related network parameters for subnetworks automatically, thus reducing requirement on network administration. Besides, DHCP can avoid address conflict to assure the re-allocation of idle resources.

System supports DHCP client, DHCP server and DHCP relay proxy.

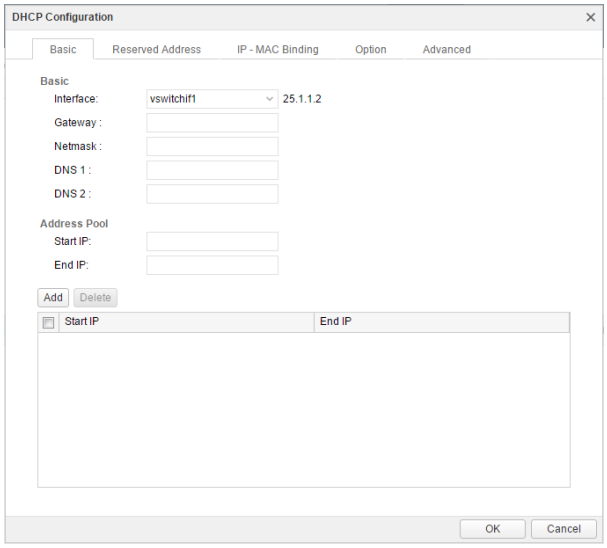
- DHCP client: The interface can be configured as a DHCP client and obtain IP addresses from the DHCP server. For more information on configuring a DHCP client, see "Configuring an Interface" on Page 12.
- DHCP server: The interface can be configured as a DHCP server and allocate IP addresses chosen from the configured address pool for the connected hosts.
- DHCP relay proxy: The interface can be configured as a DHCP relay proxy to obtain DHCP information from the DHCP server and forward the information to connected hosts.

The security devices are designed with all the above three DHCP functions, but an individual interface can be only configured with one of the above functions.

Configuring a DHCP Server

To create a DHCP server, take the following steps:

1. Select **Network > DHCP**.
2. Select **New > DHCP Server**.



3. **In the DHCP Configuration dialog, configure as following:**

Option	Description
Interface	Configures a interface which enables the DHCP server.
Gateway	Configures a gateway IP for the client.
Netmask	Configures a netmask for the client.
DNS1	Configures a primary DNS server for the client. Type the server's IP address into the box.
DNS2	Configures an alternative DNS server for the client. Type the server's IP address into the box.
Address pool	Configures an IP range in the address pool. The IPs within this range will be allocated. Take the following steps:

Option	Description
	1. Type the start IP and end IP into the Start IP and End IP box respectively. 2. Click **Add** to add an IP range which will be displayed in the list below. 3. Repeat the above steps to add more IP ranges. To delete an IP range, select the IP range you want to delete from the list and click **Delete**.

4. Configure Reserved Address (IP addresses in the Reserved Address, within the IP range of the address pool, are reserved for the DHCP server and will not be allocated).
   To configure a reserved address, click the **Reserved Address** tab, type the start and end IP for an IP range into the Start IP and End IP box respectively, and then click **Add**. To delete an IP range, select the IP range you want to delete from the list and then click **Delete**.

5. Configure IP-MAC Binding. If the IP is bound to a MAC address manually, the IP will only be allocated to the specified MAC address.
   To configure an IP-MAC Binding, click the **IP-MAC Binding** tab and type the IP and MAC address into the IP address and MAC box respectively, type the description in the Description text box if necessary, and then click **Add**. Repeat the above steps to add multiple entries. To delete an IP-MAC Binding, select an entry from the list and click **Delete**.

6. **In the Option tab, configure the options supported by DHCP server**

Option	Description
43	Option 43 is used to exchange specific vendor specific information (VSI) between DHCP client and DHCP server. The DHCP server uses option 43 to assign Access Controller (AC) addresses to wireless Access Point (AP), and the wireless AP use DHCP to discover the AC to which it is to connect. 1. Select **43** from the **Option** drop-down list. 2. Select the type of the VSI, ASCII or HEX. When selecting ASCII, the VSI matching string must be enclosed in quotes if it contains spaces. 3. Enter the VSI in the **Sign** text box. 4. Click **Add**. 5. Click **OK** to save the settings.  **Note:** If the VCI matching string has been configured, first of all, you need to verify the VCI carried by the option 60 field in client's DHCP packets. When the VCI matches the configured one, the IP address, option 43 and corresponding information will be offered. If not, DHCP server will drop client's DHCP packets and will not reply to the client.
49	After you configure the option 49 settings, the DHCP client can obtain the list of the IP addresses of systems that are running the X window System Display Manager. To configure the option 49 settings:

Option	Description
	1. Select **49** from the **Option** drop-down list. 2. Enter the IP address of the system that is running the X window System Display Manager into the **IP address** box. 3. Click **Add**. 4. Repeat the above steps to add multiple entries. To delete an entry, select it from the list and click **Delete**.
60	After configuring the VCI carried by option 60 for DHCP server, the DHCP packets sent by the DHCP server will carry this option and the corresponding VCI. 1. Select **60** from the **Option** drop-down list. 2. Select the type of the VCI, ASCII or HEX. When selecting ASCII, the VCI matching string must be enclosed in quotes if it contains spaces. 3. Enter the VCI in the **Sign** text box. 4. Click **Add**. 5. Click **OK** to save the settings.
66	The option 66 is used to configure the TFTP server name option. By configuring Option 66, the DHCP client get the domain name or the IP address of the TFTP server. You can download the startup file specified in the Option 67 from the TFTP server. 1. Select **66** from the **Option** drop-down list. 2. Select the type of the TFTP server name, ASCII or HEX. When selecting ASCII, the length of TFTP server is 1 to 255 characters, but the maximum length between the two periods (.) is only 63 characters. 3. Enter the domain name or the IP address of the TFTP server in the **Sign** text box. 4. Click **Add**. 5. Click **OK** to save the settings.
67	The option 67 is used to configure the startup file name option for the TFTP server. By configuring option 67, the DHCP client can get the name of the startup file. 1. Select **67** from the **Option** drop-down list. 2. Select the type of the startup file name, ASCII or HEX. When selecting ASCII, the length of startup file name is 1 to 255 characters. 3. Enter the startup file name in the **Sign** text box. 4. Click **Add**. 5. Click **OK** to save the settings.
138	The DHCP server uses option 138 to carry a list of 32-bit (binary) IPv4 addresses indicating one or more CAPWAP ACs available to the WTP. Then the WTP discovers and connects to the AC according to the provided AC list.

Option	Description
	1. Select **138** from the **Option** drop-down list. 2. Enter the AC IP address in the **IP address** text box. 3. Click **Add**. You can add up to four AC IP addresses. If you do not set the option 138 for the DHCP server or the DHCP client does not request option 138, DHCP server will not offer the option 138 settings.
150	The option 150 is used to configure the address options for the TFTP server. By configuring option 150, the DHCP client can get the address of the TFTP server. 1. Select **150** from the **Option** drop-down list. 2. Enter the TFTP server IP address in the **IP address** text box. 3. Click **Add**. You can configure up to 8 TFTP servers.
242	The option 242 is a private DHCP private option for IP phones. By configuring option 242, the specific parameters information of IP phone can be exchanged between DHCP server and DHCP client, such as call server address (MCIPADD), call the server port (MCPORT), the address of the TLS server (TLSSRVR), HTTP (HTTPSRVR) HTTP server address and server port (HTTPPORT) etc. 1. Select **242** from the **Option** drop-down list. 2. Select the type of the specific parameters of the IP phone, ASCII or HEX. When selecting ASCII, the length of startup file name is 1 to 255 characters. 3. Enter the specific parameters of the IP phone in the **Sign** text box. 4. Click **Add**. 5. Click **OK** to save the settings.

7. **Click the Advanced tab to configure the DHCP server's advanced options.**

Option	Description
Domain	The domain name configured by the DHCP client.
Lease	Specifies a lease time. The value range is 300 to 1048575 seconds. The default value is 3600. Lease is the period during which a client is allowed to use an IP address, starting from the time the IP address is assigned. After the lease expires, the client will have to request an IP address again from the DHCP server.
Auto configure	Enables automatic configuration. Select an interface with DHCP client enabled on the same gateway from the drop-down list. "----"indicates auto configure is not enabled. Auto configure will activate function in the following condition: Another interface with DHCP configured on the device enables DHCP client. When auto configure is enabled, if the DHCP server (Hillstone device) does not have DNS, WINS or domain name configured, the DHCP client (DHCP) will dispatch the DNS, WINS and domain name information obtained from a connected DHCP server to the host that obtains such information from the DHCP server (Hillstone device). However, the DNS, WINS and domain name that are configured manually still have the priority.

Option	Description
WINS1	Configures a primary WINS server for the client. Type the server's IP address into the box.
WINS2	Configures an alternative WINS server for the client. Type the server's IP address into the box.
SMTP server	Configures a SMTP server for the client. Type the server's IP address into the box.
POP3 server	Configures a POP3 server for the client. Type the server's IP address into the box.
News server	Configures a news server for the client. Type the server's IP address into the box.
Relay agent	When the device1 with DHCP server enabled is connected to another device2 with DHCP relay enabled, and the PC obtains device1's DHCP information from device2, then only when the relay agent's IP address and netmask are configured on device1 can the DHCP information be transmitted to the PC successfully. Relay agent: Type relay agent's IP address and netmask, i.e., the IP address and netmask for the interface with relay agent enabled on device2.
VCI-match-string	The DHCP server can verify the VCI carried by option 60 in the client' s DHCP packets.When the VCI in the client's DHCP packet matches the VCI matching string you configured in the DHCP server, the DHCP server will offer the IP address and other corresponding information. If not, the DHCP server will drop the client's DHCP packets and will not reply to the client. If you do not configure a VCI matching string for the DHCP server, it will ignore the VCI carried by option 60. 1. Select the type of the VCI matching string, ASCII or HEX. When selecting ASCII, the VCI matching string must be enclosed in quotes if it contains spaces. 2. Enter the VCI matching string in the text box.

8. Click **OK**.

Configuring a DHCP Relay Proxy

The device can act as a DHCP relay proxy to receive requests from a DHCP client and send requests to the DHCP server, and then obtain DHCP information from the server and return it to the client.

To create a DHCP relay proxy, take the following steps:

1. Select **Network > DHCP**.
2. Click **New > DHCP Relay Proxy**.
3. In the DHCP Relay Proxy dialog, select an interface to which the DHCP Relay Proxy will be applied from the Interface drop-down list.
4. Type the IP addresses of DHCP servers into the Server 1/Server 2/Server 3 boxes.
5. Click **OK**.

DDNS

DDNS (Dynamic Domain Name Server) is designed to resolve fixed domain names to dynamic IP addresses. Generally you will be allocated with a dynamic IP address from ISP each time you connect to the Internet, i.e., the allocated IP addresses for different Internet connections will vary. DDNS can bind the domain name to your dynamic IP address, and the binding between them will be updated automatically each time you connect to the Internet.

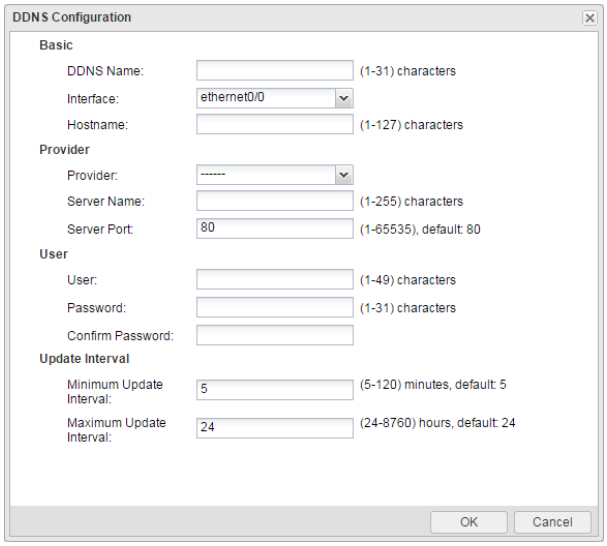
In order to enable DDNS, you will have to register in a DDNS provider to obtain a dynamic domain name. Hillstone devices support the following 5 DDNS providers, and you can visit one of the following websites to complete the registration:

- dyndns.org: http://dyndns.com/dns
- 3322.org: http://www.pubyun.com
- no-ip.com: http://www.noip.com
- Huagai.net: http://www.ddns.com.cn
- ZoneEdit.com: http://www.zoneedit.com

Configuring a DDNS

To create a DDNS, take the following steps:

1. Select **Network > DDNS**.
2. Click **New**.



3. **In the DDNS Configuration dialog, configure as follows:**

Option	Description
DDNS name	Specifies the name of DDNS.
Interface	Specifies the interface to which DDNS is applied.
Host name	Specifies the domain name obtained from the DDNS provider.
Provider	Specifies a DDNS provider. Choose one from the drop-down list.
Server name	Specifies a server name for the configured DDNS.
Server port	Specifies a server port number for the configured DDNS. The value range is 1 to 65535.
Username	Specifies the username registered in the DDNS provider.
Password	Specifies the corresponding password.
Confirm password	Enter the password again to confirm.
Min update interval	When the IP address of the interface with DDNS enabled changes, system will send an update request to the DDNS server. If the server does not respond to the request, system will send the request again according to the configured min update interval. For example, if the min update interval is set to 5 minutes, then system will send the second request 5 minutes after the first request failure; if it fails again, system will send the third request 10 (5x2) minutes later; if it fails again, and system will send the forth request 20 (10*2) minutes later, and so forth. The value will not increase anymore when reaching 120 minutes. That is, system will send the request at a fixed interval of 120 minutes. The default value is 5.
Max update interval	In case the IP address has not changed, system will send an update request to the DDNS server at the max update interval. Type the max update interval into the box. The value range is 24 to 8760 hours. The default value is 24.

4. Click **OK**.

Note: The Server name and Server port in the configuration options must be the corresponding name and port of the DDNS server. Do not configure these options if the exact information is unknown. The server will return the name and port information automatically after connection to the DDNS server has been established successfully.

PPPoE

PPPoE, Point-to-Point Protocol over Ethernet, combines PPP protocol and Ethernet to implement access control, authentication, and accounting on clients during an IP address allocation.

The implementation of PPPoE protocol consists of two stages: discovery stage and PPP session stage.

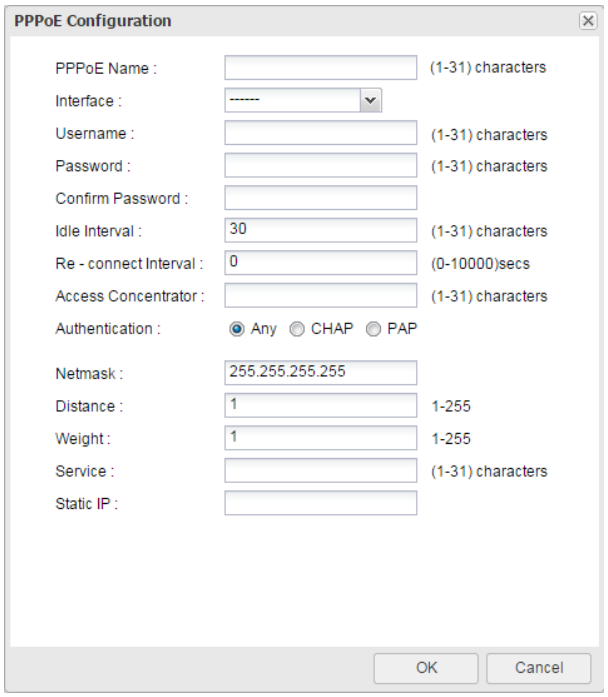
- Discovery stage: The client discovers the access concentrator by identifying the Ethernet MAC address of the access concentrator and establishing a PPPoE session ID.
- PPP session stage: The client and the access concentrator negotiate over PPP. The negotiation procedure is the same with that of a standard PPP negotiation.

Interfaces can be configured as PPPoE clients to accept PPPoE connections.

Configuring PPPoE

To create a PPPoE instance, take the following steps:

1. Select **Network > PPPoE**.
2. Click **New**.



3. **In the PPPoE Configuration dialog, configure as follows.**

Option	Description
PPPoE Name	Specifies a name for the PPPoE instance.
Interface	Select an interface from the drop-down list.
Username	Specifies a username.
Password	Specifies the corresponding password.
Conform password	Enter the password again to confirm.
Idle Interval	Automatic connection. If the PPPoE interface has been idle (no traffic) for a certain period, i.e., the specified idle interval, system will disconnect

Option	Description
	the Internet connection; if the interface requires Internet access, system will connect to the Internet automatically. The value range is 0 to 10000 minutes. The default value is 30.
Re-connect Interval	If the PPPoE connection disconnects for any reason for a certain period, i.e. the specified re-connect interval, system will try to re-connect automatically. The value range is 0 to 10000 seconds. The default value is 0, which means the function is disabled.
Access Concentrator	Specifies a name for the concentrator.
Authentication	The devices will have to pass PPPoE authentication when trying to connect to a PPPoE server. The supported authentication methods include CHAP, PAP and Any (the default, anyone between CHAP and PAP). To configure a PPPoE authentication method, click the authentication you want to select. The configured authentication must be the same with that configured in the PPPoE server.
Netmask	Specifies a netmask for the IP address obtained via PPPoE.
Distance	Specifies a route distance. The value range is 1 to 255. The default value is 1.
Weight	Specifies a route weight. The value range is 1 to 255. The default value is 1.
Service	Specifies allowed service. The specified service must be the same with that provided by the PPPoE server. If no service is specified, system will accept any service returned from the server automatically.
Static IP	You can specify a static IP address and negotiate to use this address to avoid IP change. To specify a static IP address, type it into the Static IP box.

4. Click **OK**.

Virtual Wire

The system supports the VSwitch-based Virtual Wire. With this function enabled and the Virtual Wire interface pair configured, the two Virtual Wire interfaces form a virtual wire that connects the two subnetworks attached to the Virtual Wire interface pair together. The two connected subnetworks can communicate directly on Layer 2, without any requirement on MAC address learning or other sub network's forwarding. Furthermore, controls of policy rules or other functions are still available when Virtual Wire is used.

Virtual Wire operates in two modes, which are Strict and Non-Strict mode respectively, as detailed below:

- **Strict Virtual Wire mode**: Packets can only be transmitted between Virtual Wire interfaces, and the VSwitch cannot operate in Hybrid mode. Any PC connected to Virtual Wire can neither manage devices nor access Internet over this interface.
- **Non-Strict Virtual Wire mode**: Packets can be transmitted between Virtual Wire interfaces, and the VSwitch also supports data forwarding in Hybrid mode. That is, this mode only restricts Layer 2 packets' transmission between Virtual Wire interfaces, and does not affect Layer 3 packets' forwarding.

The table below lists packet transmission conditions in Strict Virtual Wire and Non-Strict Virtual Wire mode. You can choose an appropriate Virtual Wire mode according to the actual requirement.

Packet	Strict	Non-strict
Egress and ingress are interfaces of one Virtual Wire interface pair	Allow	Allow
Ingress is not Virtual Wire's interface	Deny	Deny
Egress and ingress are interfaces of different Virtual Wire interface pairs	Deny	Deny
Ingress of to-self packet is a Virtual Wire’ s interface	Deny	Allow
Ingress is Virtual Wire's interface, and egress is a Layer 3 interface	Deny	Allow

Configuring a Virtual-Wire

To create a Virtual-Wire, take the following steps:

1. Select **Network > Virtual-Wire**.
2. Click **New**.
3. In the Virtual-Wire Configuration dialog, select a virtual switch from the VSwitch drop-down list.
4. In the Interface 1 drop-down list, specify an interface for the virtual wire interface pair. The two interfaces in a single virtual wire interface pair must be different, and one interface cannot belong to two different virtual wire interface pairs simultaneously.
5. In the Interface 2 drop-down list, specify an interface for the virtual wire interface pair. The two interfaces in a single virtual wire interface pair must be different, and one interface cannot belong to two different virtual wire interface pairs simultaneously.
6. Click **OK**.

Configuring the Virtual Wire Mode

To configure a virtual wire mode, take the following steps:

1. Select **Network > Virtual-Wire**.
2. Click **Virtual-Wire Mode**.
3. In the Virtual-Wire Mode Configuration dialog, select a virtual switch from the VSwitch drop-down list.

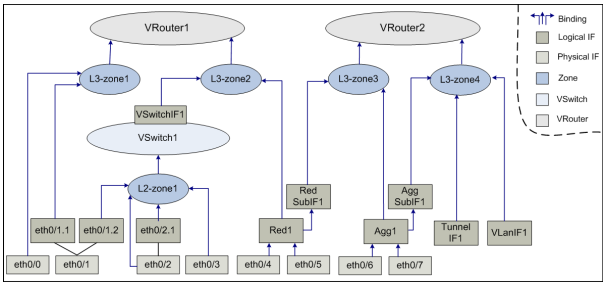
4. Specify a virtual wire mode from one of the following options:

   - Strict - Packets can only be transmitted between virtual wire interfaces, and the VSwitch cannot operate in Hybrid mode. Any PC connected to the virtual wire can neither manage devices nor access Internet over this interface.
   - Non-strict - Packets can be transmitted between virtual wire interfaces, and the VSwitch also supports data forwarding in Hybrid mode. That is, this mode only restricts Layer 2 packets' transmission between virtual wire interfaces, and does not affect Layer 3 packets' forwarding.
   - Disabled - Disables the virtual wire.

5. Click **OK**.

Virtual Router

Virtual Router (VRouter) is known as VR in system. VR acts as a router, and different VRs have their own independent routing tables. A VR named "trust-vr" is implemented with the system, and by default, all of the Layer 3 security zones are bounded to the trust-vr automatically. Hillstone devices support multiple VRs, and the max amount of supported VRs may vary with different hardware platforms. Multiple VRs divide a device into multiple virtual routers, and each router utilizes and maintains their independent routing table. In such a case one device is acting as multiple routers. Multiple VRs allow a device to achieve the effects of the address isolation between different route zones and address overlapping between different VRs, as well as to avoid route leaking to some extent, enhancing route security of network. For more information about the relationship between interface, security zone, VSwitch and VRouter, see the following diagram:



As shown above, the binding relationship between them are:

- Interfaces are bound to security zones. Those that are bound to Layer 2 security zones and Layer 3 security zones are known as Layer 2 interfaces and Layer 3 interfaces respectively. One interface can be only bound to one security zone; the primary interface and sub interface can belong to different security zones.
- Security zones are bound to a VSwitch or VRouter. Layer 2 security zones are bound to a VSwitch (by default the pre-defined Layer 2 security zone is bound to the default VSwitch1), and Layer 3 security zones are bound to a VRouter (by default the pre-defined Layer 3 security zone is bound to the default trust-vr), thus realizing the binding between the interfaces and VSwitch or VR. One security zone can be only bound to one VSwtich or VR.

Creating a Virtual Router

To create a Virtual Router, take the following steps:

1. Select **Network > Virtual Router > Virtual Router**.
2. Click **New**.
3. Type the name into the Virtual Router name box.
4. Click **OK**.

Virtual Switch

System might allow packets between some interfaces to be forwarded in Layer 2 (known as transparent mode), and packets between some interfaces to be forwarded in Layer 3 (known as routing mode), specifically depending on the actual requirement. To facilitate a flexible configuration of hybrid mode of Layer 2 and Layer3, system introduces the concept of Virtual Switch (VSwitch). By default system uses a VSwitch known as VSwitch1. Each time you create a VSwitch, system will create a corresponding VSwitch interface (VSwitchIF) for the VSwitch automatically. You can bind an interface to a VSwitch by binding that interface to a security zone, and then binding the security zone to the VSwitch.

A VSwitch acts as a Layer 2 forwarding zone, and each VSwitch has its own independent MAC address table, so the packets of different interfaces in one VSwitch will be forwarded according to Layer 2 forwarding rules. You can configure policy rules conveniently in a VSwitch. A VSwitchIF virtually acts as a switch uplink interface, allowing packets forwarding between Layer 2 and Layer 3.

Creating a VSwitch

To create a VSwitch, take the following steps:

1. Select **Network > VSwitch**.
2. Click **New**.

Options are described as follows.

Option	Description
VSwitch Name	Specifies a name for the VSwitch.
Vsys Shared	Select the **Enable** check box and then system will share the VSwitch with different VSYS.
Virtual-Wire Mode	Specifies a Virtual-Wire mode for the VSwitch, including (for specific information on Virtual Wire, see "Virtual Wire" on Page 52) • Strict - Packets can only be transmitted between Virtual Wire interfaces, and the VSwitch cannot operate in Hybrid mode. Any PC connected to Virtual Wire can neither manage devices nor access Internet over this interface. • Non-strict - Packets can be transmitted between Virtual Wire interfaces, and the VSwitch also supports data forwarding in Hybrid mode. That is, this mode only restricts Layer 2 packets' transmission between Virtual Wire interfaces, and does not affect Layer 3 packets' forwarding. • Disabled - Disables Virtual Wire.
IGMP Snooping	Enables IGMP snooping on the VSwitch.
Forward Tagged Packets	Enables VLAN transparent so that the device can transmit VLAN tagged packets transparently, i.e., packets tagged with VLAN ID will still keep the original ID after passing through the device.
Forward Double Tagged Packets	Enables VLAN transparent so that the device can transmit VLAN double tagged packets transparently, i.e., packets tagged with VLAN ID will still keep the original ID after passing through the device.
Drop Unknown Multicast Packets	Drops the packets sent to unknown multicast to save bandwidth.

3. Click **OK**.

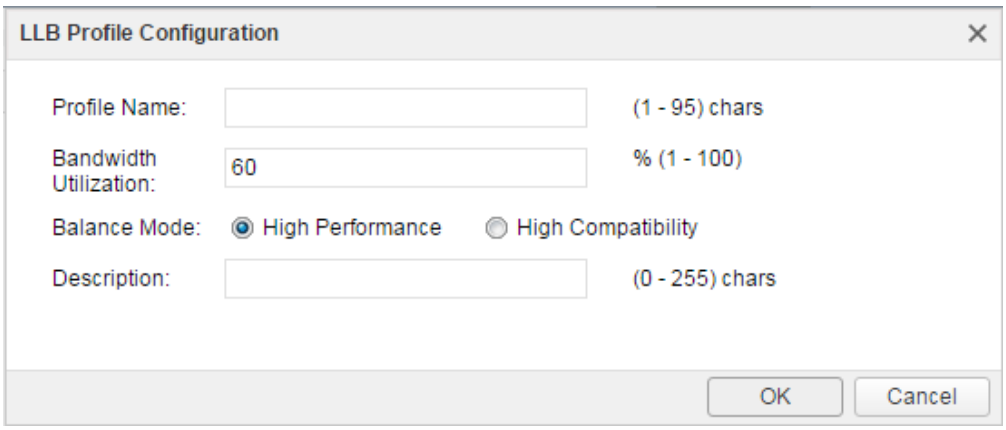
Outbound Link Load Balancing

For Outbound LLB, the system can intelligently oute and dynamically adjust the traffic load of each link by monitoring the delay, jitter, packet loss rate and bandwidth utilization of each link in real-time.You can configure a flexible LLB profile to bind to the route (the current system only supports DBR and PBR), forming LLB rules to implement outbound dynamic link load balancing, and thus make efficient use of network bandwidth.

Configuring LLB Profile

The LLB profile contains the parameters of the load balancing algorithm, such as bandwidth utilization threshold, probe switch, probe mode, and equalization direction.

1. Select **Network > Outbound > Profile**.
2. Click **New**.



3. **In the LLB Profile Configurion, configure as follows:**

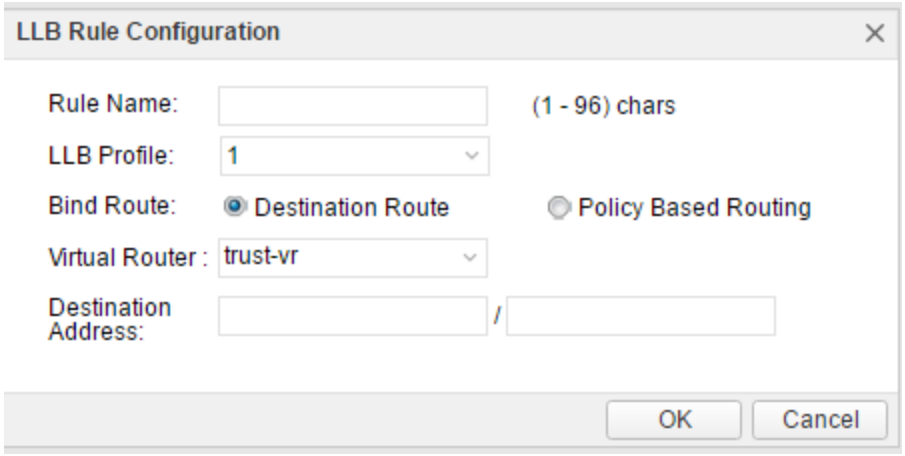
Option	Description
Profile Name	Specifies the Profile name whose length range is 1-96 characters.
Bandwidth Utilization	Specifies the bandwidth utilization threshold of the interface. When the rate does not exceed the threshold by the interface bandwidth, the system will only analysis delay, jitter and packet loss rate to dynamically adjust the routing link; when the rate exceeds the threshold by the interface bandwidth,system will analysis of each link bandwidth utilization rate of the parameters at the same time to adjust the routing method. Value ranges from 0 to 100 (0% to 100%) and defaults to 60.
Subnet Mask	Specifies the destination IP segment of the detect task. System carries out real-time monitoring of the traffic flow of the network segment, and adjusts the traffic load balance according to the monitoring and statistical results. It ranges from 8 to 32 and defaults to 28.
Balance Mode	There are two equalization modes: High Performance and High Compatibility. • High Performance - In this mode, system adjusts link to keep the link balance as fast as possible • High Compatibility - When the link load changes, system does not switch the link frequently, but ensures that the service is as far as possible on the previous link. This mode is suitable for services that are sensitive to link switching, such as banking services, only when the previous link is overloaded.
Description	Configure Additional details for the LLB profile.

4. Click **OK**.

Configuring LLB Rule

The LLB Profile and the route is bound by the formation of LLB rules that currently support binding destination routing (DBR) and policy-based routing (PBR).

1. Select **Network > Outbound > Rule**.
2. Click **New**.



3. **In the LLB Rule Configurion, configure the following:**

Option	Description
Rule Name	Specifies the Rule name,length of 1-96 characters
Profile Name	Specifies the bandwidth utilization threshold. It is in the range of 0-100 (0% -100%) and defaults to 60.
Bind Route	Specify the route to be bound in the rule:Destination Route or Policy Based Route. • Destination Route - When this option is selected, specify the Vrouter and destination address of the destination route. • Policy Based Route - Select this option to specify the name and id of the policy route.

4. Click **OK**.

Configuring DNS Balance

When the LLB DNS balancing function is enabled, system will balance the load of the outgoing interfaces of all of the configured DNS servers. The DNS request packets will be redirected to the link with the lower load.

To enable DNS Balance, take the following steps:

1. Select **Network >Outbound >DNS Balance Configuration**.
2. Select **Enable**. System will enable DNS Balance.

Note: To enable LLB DNS equalization, you must first enable the DNS transparent proxy function.

Inbound Link Load Balancing

After enabling the LLB for inbound traffic, the system will resolve domains of different IPs based on the sources of the DNS requests and return IPs for different ISPs to the corresponding users who initiate the requests, which reduces access across ISPs. Such a resolution method is known as SmartDNS.

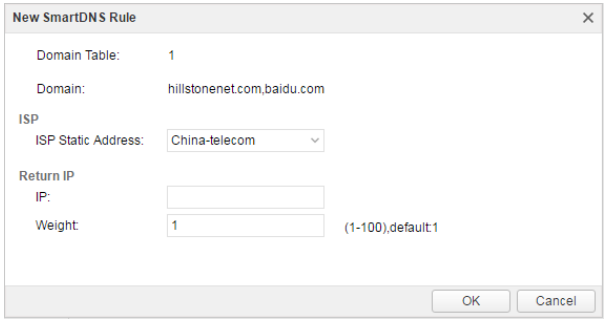
You can enable inbound LLB by the following steps:

1. Enable SmartDNS. This is the prerequisite for the implementation of inbound LLB.
2. Configure a SmartDNS rule table. The smart domain-to-IP resolution is implemented based on the rule table.

Creating a SmartDNS Rule Table

To create a SmartDNS rule table, take the following steps:

1. Select **Network > Inbound**.
2. Click **New > Domain Table**.
3. In the Domain Configuration dialog, type a domain table name into Domain Table text box.
4. Type a domain name into Domain text box. Separate multiple domain names with comma. Each rule table supports up to 64 domain names (case insensitive).
5. Click **OK**.
6. In the Inbound LLB page, click the domain table name you already created and then click **New > SmartDNS Rule**.



In the New SmartDNS Rule, configure the following:

Option	Description
ISP Static Address	Select a predefined or user-defined ISP from the drop-down list. If the source address matches any address entry of the ISP, system will return the specified IP.
Return IP	Specifies the return IP for different request sources. Options include: • IP - Specifies the return IP. You can configure up to 64 IPs for a domain name. • Weight - Specifies the weight of the return IP. The value range is 1 to 100. The default value is 1. In the SmartDNS rule table, one domain name might correspond to multiple IPs. System will sort the IPs based on the weight and then return to the users.

7. Click **OK**.

Note: The ISP route being referenced by the SmartDNS rule table cannot be deleted.

Application Layer Gateway (ALG)

Some applications use multi-channels for data transmission, such as the commonly used FTP. In such a condition the control channel and data channel are separated. Devices under strict security policy control may set strict limits on each data channel, like only allowing FTP data from the internal network to the external network to transfer on the well-known port TCP 21. Once in the FTP active mode, if a FTP server in the public network tries to initiate a connection to a random port of the host in the internal network, devices will reject the connection and the FTP server will not work properly in such a condition. This requires devices to be intelligent enough to properly handle the randomness of legitimate applications under strict security policies. In FTP instances, by analyzing the transmission information of the FTP control channel, devices will be aware that the server and the client reached an agreement, and open up a temporary communication channel when the server takes the initiative to connect to a port of the client, thus assuring the proper operation of FTP.

The system adopts the strictest NAT mode. Some VoIP applications may work improperly after NAT due to the change of IP address and port number. The ALG mechanism can ensure the normal communication of VoIP applications after the NAT. Therefore, the ALG supports the following functions:

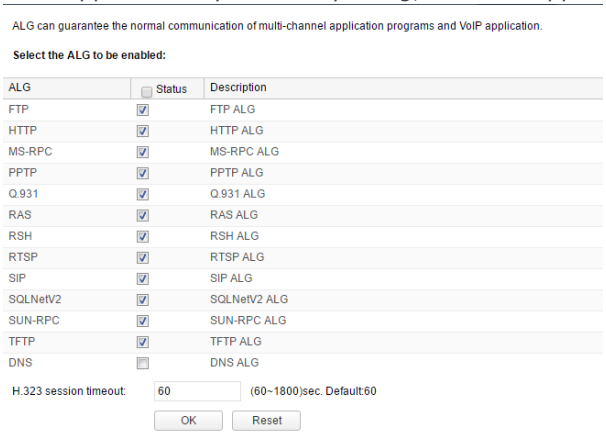
- Ensures normal communication of multi-channel applications under strict security policy rules.
- Ensures the proper operation of VoIP applications such as SIP and H.323 in NAT mode, and performs monitoring and filtering according to policies.

Enabling ALG

The system allows you to enable or disable ALG for different applications. Devices support ALG for the following applications: FTP, HTTP, MSRPC, PPTP, Q.931, RAS, RSH, RTSP, SIP, SQLNetV2, SUNRPC, TFTP, DNS, and Auto. You can not only enable ALG for applications, but also specify H323's session timeout.

To enable the ALG for applications, take the following steps:

1. Select **Networl> Application Layer Gate**.
2. In the Application Layer Gateway dialog, select the applications that require ALG.



3. To modify H323's session timeout, type the value into the **H323 session timeout** box. The value range is 60 to 1800 seconds. The default value is 60.
4. Click **OK** to save your changes.

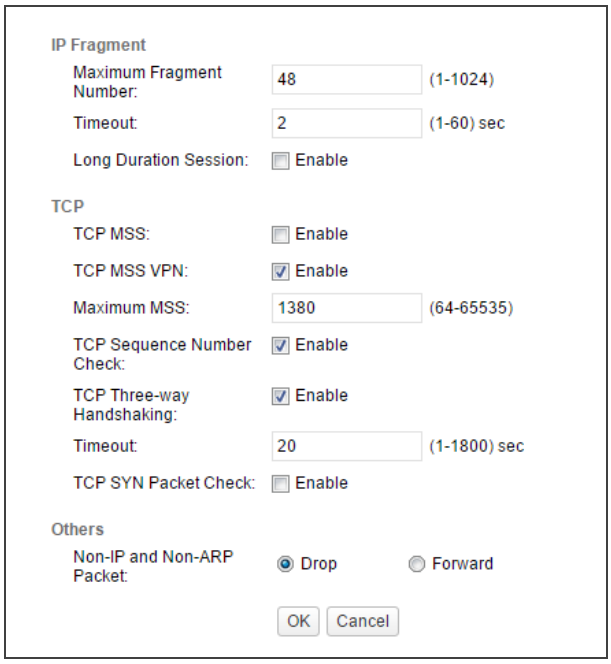
Global Network Parameters

Global network parameter configuration includes IP fragment, TCP packet processing methods and other options.

Configuring Global Network Parameters

To configure global network parameters, take the following steps:

1. Select **Network > Global Network Parameters > Global Network Parameters**.



2. **Configure the following parameters.**

Option	Description
IP Fragment	
Maximum Fragment Number	Specifies a maximum fragment number for every IP packet. The value range is 1 to 1024. The default value is 48. Any IP packet that contains more fragments than this number will be dropped.
Timeout	Specifies a timeout period of fragment reassembling. The value range is 1 to 30. The default value is 2. If the Hillstone device has not received all the fragments after the timeout, the packet will be dropped.
Long Duration Session	Enables or disables long duration session. If this function is enabled, specify long duration session's percentage in the Percentage text box below. The default value is 10, i.e., 10% of long duration session in the total sessions.
TCP	
TCP MSS	Specifies a MSS value for all the TCP SYN/ACK packets. Select the **Enable** check box, and type the value into the Maximum MSS text box below.
Maximum MSS	Type the max MSS value into the Maximum MSS text box below. The value range is 64 to 65535. The default value is 1448.
TCP MSS VPN	Specifies a MSS value for IPSec VPN's TCP SYN packets. Select the **Enable** check box, and type the value into the Maximum MSS text box below.
Maximum MSS	Type the max MSS value for IPSEC VPN into the Maximum MSS text box below. The value range is 64 to 65535. The default value is 1380.
TCP Sequence Number Check	Configures if the TCP sequence number will be checked. When this function is enabled, if the TCP sequence number exceeds TCP window, that TCP packet will be dropped.
TCP Three-way Handshaking	Configures if the timeout of TCP three-way handshaking will be checked. Select the **Enable** check box to enable this function, and specify a timeout value in the Timeout text box below. The value range is 1 to 1800 seconds. The default value is 20. If the three-way handshaking has not been completed after timeout, the connection will be dropped.
TCP SYN Packet Check	Select the **Enable** check box to enable this function, and only when a packet is a TCP SYN packet can a connection be established.
Others	
Non-IP and Non-ARP Packet	Specifies how to process packets that are neither IP nor ARP.

3. Click **OK**.

Configuring Protection Mode

To configure the protection mode, take the following steps:

1. Select **Network > Global Network Parameters > Protection Mode**.
2. Click **Protection Mode** tab, and configure the traffic working mode.

- Log & reset - System not only generates protocol anomaly alarms and attacking behavior logs, but also blocks attackers or resets connections.

- Log only - System only generates protocol anomaly alarms and attacking behavior logs, but will not block attackers or reset connections.

Note: Log & reset mode is recommended. In this mode, the security performance of the device can take effect normally. If log only mode is selected, system can only record logs, and functions which can block traffic in system will be invalid, including policy, IPS, AV, QoS, etc.

Chapter 4 Advanced Routing

Routing is the process of forwarding packets from one network to the destination address in another network. Router, a packet forwarding device between two networks, is designed to transmit packets based on the various routes stored in routing tables. Each route is known as a routing entry.

Hillstone devices are designed with Layer 3 routing. This function allows you to configure routing options and forward various packets via VRouter. System implements with a default VRouter trust-vr, and also supports multiple VRouters (multi-VR).

Hillstone devices support destination routing, ISP routing, Source-Based Routing (SBR), Source-Interface-Based Routing (SIBR), Destination-Interface-Based Routing (DIBR), Policy-Based Routing (PBR), dynamic routing (including RIP, OSPF and BGP) and Equal Cost MultiPath Routing (ECMP).

- Destination Routing: A manually-configured route which determines the next routing hop according to the destination IP address.
- DIBR: A manually-configured route which determines the next routing hop according to the destination IP address and ingress interface.
- SBR: Source IP based route which selects routers and forwards data according to the source IP address.
- SIBR: Source IP and ingress interface based route.
- ISP Profile: Add a subnet to an ISP.
- ISP Routing: A kind of route which determines the next hop based on different ISPs.
- PBR: A route which forwards data based on the source IP, destination IP address and service type.
- Dynamic Routing: Selects routers and forwards data according to the dynamic routing table generated by dynamic routing protocols (RIP, OSPF or BGP).
- ECMP: Load balancing traffic destined to the same IP address or segment in multiple routes with equal management distance.

When forwarding the inbound packets, the device will select a route in the following sequence: PBR > SIBR > SBR > DIBR > Destination routing/ISP routing/Proximity routing/Dynamic routing.

Routing supports IPv4 and IPv6 address. If IPv6 is enabled, you can configure IPv6 address entry for the routing rule.

Related Topics:

- "Destination Route" on Page 66
- "Destination-Interface Route" on Page 67
- "Source Route" on Page 69
- "Source-Interface Route" on Page 71
- "ISP Profile" on Page 73
- "ISP Route" on Page 75
- "Policy-based Route" on Page 77
- "RIP" on Page 85

Destination Route

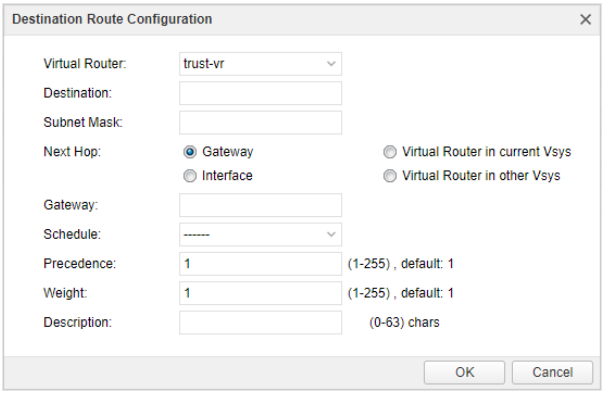
The destination route is a manually-configured route entry that determines the next routing hop based on the destination IP address. Usually a network with comparatively a small number of outbound connections or stable Intranet connections will use a destination route. You can add a default route entry at your own choice as needed.

Creating a Destination Route

To create a destination route, take the follwing steps:

1. Select **Network** > **Routing** > **Destination Route**.
2. Click **New**.

   In the Destination Route Configuration dialog box, enter values.



Option	Description
Virtual Router	From the Virtual Router drop-down list, select the Virtual Routerouter for the new route. The default value is "trust-vr".
Destination	Type the IP address for the route into the text box.
Subnet Mask	Type the corresponding subnet mask into the text box.
Next Hop	To specify the type of next hop, click **Gateway**, **Current VRouter**, **Interface**, or **Other VRouter**. • Gateway: Type the IP address into the **Gateway** text box. • Current VRouter: Select a name from the drop-down list. • Interface: Select a name from the **Interface** drop-down list. Type the IP address into the **Gateway** text box. For a tunnel interface, you need to type the gateway address for the tunnel's peer in the optional box below. • Other VRouter: Select a name from the **Vsys** drop-down list. Select a name from the **Virtual Router** drop-down list.
Schedule	Specifies a schedule when the rule will take effect. Select a desired schedule from the **Schedule** drop-down list. After selecting the desired schedules, click the blank area in this dialog to complete the schedule configuration. To create a new schedule, click **New Schedule**.
Precedence	Type the route precedence into the text box. The smaller the parameter is, the higher the precedence is. If multiple routes are available, the route with higher precedence will be prioritized. The value range is 1 to 255.

Option	Description
	The default value is 1. When the value is set to 255, the route will be invalid.
Weight	Type the weight for the route into the text box. This parameter is used to determine the weight of traffic forwarding in load balance. The value range is 1 to 255. The default value is 1.
Description	Type the description information into the Description text box if necessary.

3. Click **OK**.

Destination-Interface Route

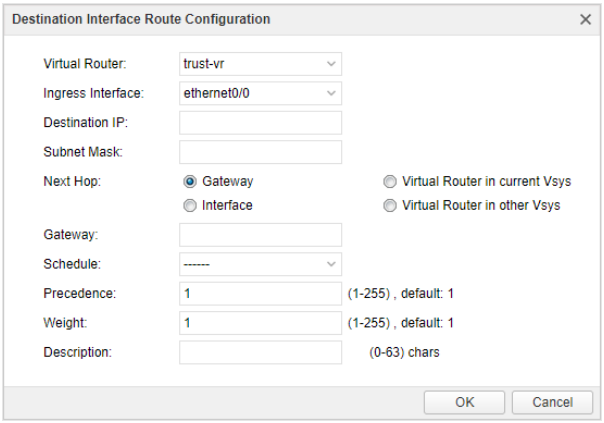
Destination interface route is designed to select a route and forward data based on the Destination IP address and ingress interface of a packet.

Creating a Destination-Interface Route

To create a Destination-Interface route, take the following steps:

1. Select **Network** > **Routing** > **Destination Interface Route**.
2. Click **New**.

   In the Destination Interface Route Configuration dialog box, enter values.



Option	Description
Virtual Router	From the Virtual Router drop-down list, select the Virtual Routerouter for the new route. The default value is "trust-vr".
Ingress Interface	Select an interface for the route from the drop-down list.
Destination IP	Type the Destination IP for the route into the textbox.
Subnet Mask	Type the corresponding subnet mask into the textbox.
Next Hop	To specify the type of next hop, click **Gateway**, **Virtual Router in current Vsys**, **Interface**, or **Virtual Router in other Vsys**. • Gateway: Type the IP address into the **Gateway** text box. • Virtual Router in current Vsys: Select a name from the **Virtual Router** drop-down list. • Interface: Select a name from the **Interface** drop-down list. Type

Option	Description
	the IP address into the **Gateway** text box. For a tunnel interface, you need to type the gateway address for the tunnel's peer in the optional box below. • Virtual Router in other Vsys: Select a name from the **Vsys** drop-down list. Select a name from the **Virtual Router** drop-down list.
Schedule	Specifies a schedule when the rule will take effect. Select a desired schedule from the **Schedule** drop-down list. After selecting the desired schedules, click the blank area in this dialog to complete the schedule configuration. To create a new schedule, click **New Schedule**.
Precedence	Type the route precedence into the textbox. The smaller the parameter is, the higher the precedence is. If multiple routes are available, the route with higher precedence will be prioritized. The value range is 1 to 255. The default value is 1. When the value is set to 255, the route will be invalid.
Weight	Type the weight for the DIBR into the textbox. This parameter is used to determine the weight of traffic forwarding in load balance. The value range is 1 to 255. The default value is 1.
Description	Type the description information into the Description text box if necessary.

3. Click **OK**.

Source Route

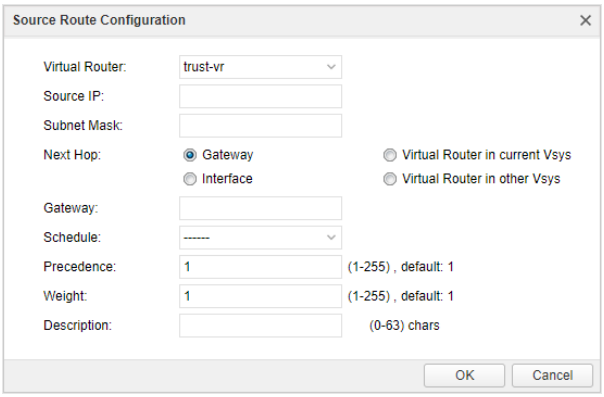
Source route is designed to select a router and forward data based on the source IP address of a packet.

Creating a Source Route

To create a source route, take the following steps:

1. Select **Network** > **Routing** > **Source Route**.
2. Click **New**.

   In the Source Route Configuration dialog box, enter values.



Option	Description
Virtual Router	From the Virtual Router drop-down list, select the Virtual Routerouter for the new route. The default value is "trust-vr".
Source IP	Type the source IP for the route into the box.
Subnet Mask	Type the corresponding subnet mask into the box.
Next Hop	To specify the type of next hop, click **Gateway**, **Virtual Router in current Vsys**, **Interface**, or **Virtual Router in other Vsys**. • Gateway: Type the IP address into the **Gateway** text box. • Virtual Router in current Vsys: Select a name from the drop-down list. • Interface: Select a name from the **Interface** drop-down list. Type the IP address into the **Gateway** text box. For a tunnel interface, you need to type the gateway address for the tunnel's peer in the optional box below. • Virtual Router in other Vsys: Select a name from the **Vsys** drop-down list. Select a name from the **Virtual Router** drop-down list.
Schedule	Specifies a schedule when the rule will take effect. Select a desired schedule from the **Schedule** drop-down list. After selecting the desired schedules, click the blank area in this dialog to complete the schedule configuration. To create a new schedule, click **New Schedule**.
Precedence	Type the route precedence into the box. The smaller the parameter is, the higher the precedence is. If multiple routes are available, the route with higher precedence will be prioritized. The value range is 1 to 255. The default value is 1. When the value is set to 255, the route will be invalid.

Option	Description
Weight	Type the weight for the route into the box. This parameter is used to determine the weight of traffic forwarding in load balance. The value range is 1 to 255. The default value is 1.
Description	Type the description information into the Description text box if necessary.

3. Click **OK**.

Source-Interface Route

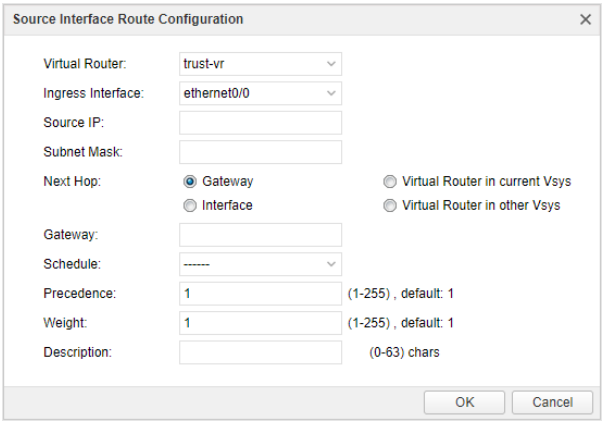
Source interface route is designed to select a router and forward data based on the source IP address and ingress interface of a packet.

Creating a Source-Interface Route

To create a Source-Interface route, take the following steps:

1. Select **Network** > **Routing** > **Source Interface Route**.
2. Click **New**.

   In the Source Interface Route Configuration dialog box, enter values.



Option	Description
Virtual Router	From the Virtual Router drop-down list, select the Virtual Routerouter for the new route. The default value is "trust-vr".
Ingress Interface	Select an interface for the route from the drop-down list.
Source IP	Type the source IP for the route into the textbox.
Subnet Mask	Type the corresponding subnet mask into the textbox.
Next Hop	To specify the type of next hop, click **Gateway**, **Virtual Router in current Vsys**, **Interface**, or **Virtual Router in other Vsys**. • Gateway: Type the IP address into the **Gateway** text box. • Virtual Router in current Vsys: Select a name from the **Virtual Router** drop-down list. • Interface: Select a name from the **Interface** drop-down list. Type the IP address into the **Gateway** text box. For a tunnel interface, you need to type the gateway address for the tunnel's peer in the optional box below. • Virtual Router in other Vsys: Select a name from the **Vsys** drop-down list. Select a name from the **Virtual Router** drop-down list.
Schedule	Specifies a schedule when the rule will take effect. Select a desired schedule from the **Schedule** drop-down list. After selecting the desired schedules, click the blank area in this dialog to complete the schedule configuration. To create a new schedule, click **New Schedule**.

Option	Description
Precedence	Type the route precedence into the textbox. The smaller the parameter is, the higher the precedence is. If multiple routes are available, the route with higher precedence will be prioritized. The value range is 1 to 255. The default value is 1. When the value is set to 255, the route will be invalid.
Weight	Type the weight for the ISP route into the textbox. This parameter is used to determine the weight of traffic forwarding in load balance. The value range is 1 to 255. The default value is 1.
Description	Type the description information into the Description text box if necessary.

3. Click **OK**.

ISP Profile

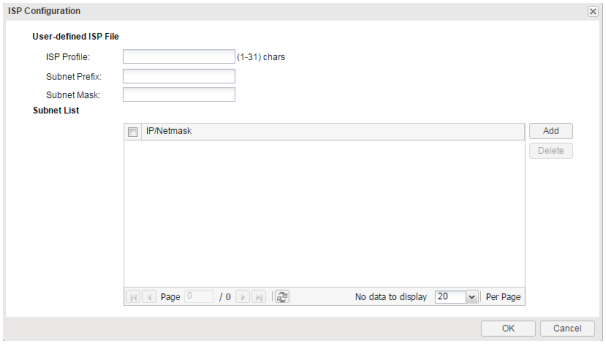
To configure an ISP route, you need to first add a subnet to an ISP, and then configure the ISP route. The destination of the route is determined by the name of the ISP. You can customize ISP information, or upload profiles that contain different ISP information.

Creating an ISP Profile

To create an ISP Profile, take the following steps:

1. Select **Network** > **Routing** > **ISP Profile**.
2. Click **New**.

   In the ISP Configuration dialog box, enter values.



Option	Description
ISP Profile	Type the name for the new ISP profile into the textbox.
Subnet Prefix	Type the IP address for the subnet into the textbox.
Subnet Mask	Type the subnet mask into the textbox.
Add	Add the subnet to the ISP profile. The subnet will be displayed in the ISP subnet list below. If needed, repeat the steps to add multiple subnets for the ISP profile.
Delete	Delete the selected ISP profiles.

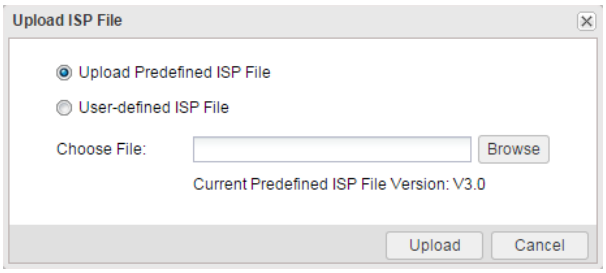
3. Click **OK**.

Uploading an ISP Profile

To upload an ISP Profile, take the following steps:

1. Select **Network** > **Routing** > **ISP Profile**.
2. Click **Upload**.

   In the Upload ISP File dialog box, enter values.



Option	Description
Upload Pre-defined IPS File	To update the predefined IPS file: 1. Select **Upload Predefined IPS File**. 2. Click **Browse** to select an ISP profile in your PC.
User-defined IPS File	To update the user-defined IPS file: 1. Select **Upload Predefined IPS File**. 2. Click **Browse** to select an ISP profile in your PC.

3. Click **Upload** to upload the selected ISP profile to device.

Saving an ISP Profile

To save an ISP Profile, take the following steps:

1. Select **Network** > **Routing** > **ISP Profile**.
2. Click **Save**.
3. In the Save User-defined ISP Configuration dialog box, select an ISP profile from the **ISP profile** drop-down list.
4. Click **Save** to save the profile to a specified location in PC.

ISP Route

Generally many users might apply for multiple lines for load balancing purpose. However, a typical balance will not have the function based on the traffic's direction. For such a scenario, the device provides the ISP route, which allows traffic from different ISPs to take their proprietary routes, thus accelerating network access.

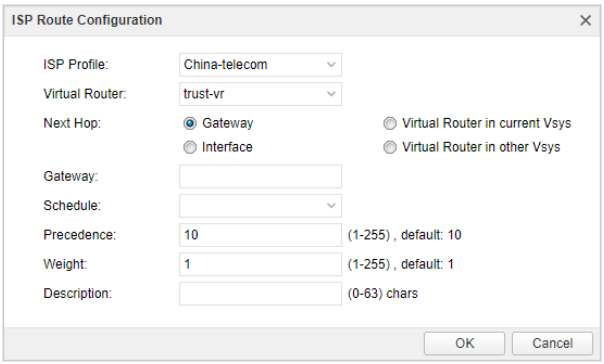
To configure an ISP route, first you need to add a subnet to an ISP, and then configure the ISP route. The destination of the route is determined by the name of the ISP. You can customize ISP information, or upload profiles that contain different ISP information.

Creating an ISP Route

To create an ISP route, take the following steps:

1. Select **Network** > **Routing** > **ISP Route**.
2. Click **New**.

   In the ISP Configuration dialog box, enter values.



Option	Description
ISP Profile	Select an ISP profile name from the drop-down list.
Virtual Router	From the **Virtual Router** drop-down list, select the Virtual Router for the new route. The default value is "trust-vr".
Next hop	To specify the type of next hop, click **Gateway**, **Current VRouter**, **Interface**, or **Other VRouter**. • Gateway: Type the IP address into the **Gateway** text box. • Current VRouter: Select a name from the **Virtual Router** drop-down list. • Interface: Select a name from the **Interface** drop-down list. Type the IP address into the **Gateway** text box. For a tunnel interface, you need to type the gateway address for the tunnel's peer in the optional box below. • Other VRouter: Select a name from the **Vsys** drop-down list. Select a name from the **Virtual Router** drop-down list.
Schedule	Specifies a schedule when the rule will take effect. Select a desired schedule from the **Schedule** drop-down list. After selecting the desired schedules, click the blank area in this dialog to complete the schedule configuration. To create a new schedule, click **New Schedule**.
Precedence	Type the route precedence into the textbox. The smaller the parameter is,

Option	Description
	the higher the precedence is. If multiple routes are available, the route with higher precedence will be prioritized. The value range is 1 to 255. The default value is 10. When the value is set to 255, the route will be invalid.
Weight	Type the weight for the ISP route into the textbox. This parameter is used to determine the weight of traffic forwarding in load balance. The value range is 1 to 255. The default value is 1.
Description	Type the description information into the Description text box if necessary.

3. Click **OK**.

Policy-based Route

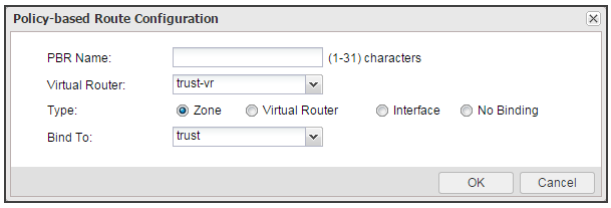
Policy-based Route (PBR) is designed to select a router and forward data based on the source IP address, destination IP address and service type of a packet.

Creating a Policy-based Route

To create a Policy-based route, take the following steps:

1. Select **Network** > **Routing** > **Policy based Routing**.
2. Click **New**. Select **PBR** from the drop-down list.

   In the Policy-based Route Configuration dialog box, configure the following.



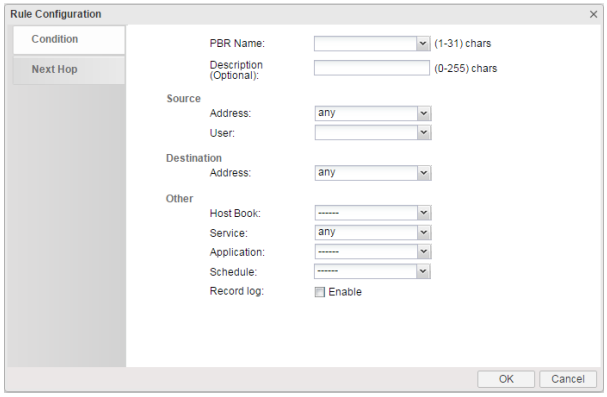
Option	Description
PBR name	Specifies a name for the policy-based route.
Virtual Router	From the Virtual Router drop-down list, select the Virtual Router for the new route. The default value is "trust-vr".
Type	Specifies the object type that the policy-based route binds to. You can select **Zone**, **Virtual Router**, **Interface** or **No Binding**. • Zone: Click this option button and select a zone from the **Zone** drop-down list. • Virtual Router: Click this option button and show the virtual router that the policy-based route bind to. • Interface: Click this option button and select a interface from the **Interface** drop-down list. • No Binding: This policy-based route is no binding.

3. Click **OK**.

Creating a Policy-based Route Rule

To create a Policy-based Route rule, take the following steps:

1. Select **Network** > **Routing** > **Policy Based Routing**.
2. Click **New**. Select **Rule** from the drop-down list.



In the Rule Condition tab, configure the following.

Option	Description
PBR name	Specifies a name for the policy-based route.
Description (Optional)	Type information about the PBR rule.
Source	
Address	Specifies the source addresses of PBR rule. 1. Select an address type from the **Address** drop-down list. 2. Select or type the source addresses based on the selected type. 3. Click → to add the addresses to the right pane. 4. After adding the desired addresses, click the blank area in this dialog to complete the source address configuration. You can also perform other operations: • When selecting the **Address Book** type, you can click **Add** to create a new address entry. • The default address configuration is any. To restore the configuration to this default one, select the **any** check box.
User	Specifies a role, user or user group for the PBR rule. 1. From the **User** drop-down menu, select the AAA server which the users and user groups belongs to. To specify a role, select **Role** from the **AAA Server** drop-down list. 2. Based on different types of AAA server, you can execute one or more actions: search a user/user group/role, expand the user-/user group list, enter the name of the user/user group. 3. After selecting users/user groups/roles, click → to add them to the right panes. 4. After adding the desired objects, click the blank area in this dialog to complete the user configuration.

Option	Description
Destination	
Address	Specifies the destination addresses of PBR rule. 1. Select an address type from the **Address** drop-down list. 2. Select or type the source addresses based on the selected type. 3. Click → to add the addresses to the right panes. 4. After adding the desired addresses, click the blank area in this dialog to complete the destination address configuration. You can also perform other operations: • When selecting the **Address Book** type, you can click **Add** to create a new address entry. • The default address configuration is any. To restore the configuration to this default one, select the **any** check box.
Other	
Host Book	Specifies the Host-book of PBR rule. Select an Host-book from the **Host Book** drop-down list.
Service	Specifies a service or service group. 1. From the **Service** drop-down menu, select a type: Service, Service Group. 2. You can search the desired service/service group, expand the service/service group list. 3. After selecting the desired services/service groups, click → to add them to the right panes. 4. After adding the desired objects, click the blank area in this dialog to complete the service configuration. You can also perform other operations: • To add a new service or service group, click **Add**. • The default service configuration is any. To restore the configuration to this default one, select the **any** check box.
Application	Specifies an application/application group/application filters. 1. From the **Application** drop-down menu, you can search the desired application/application group/application filter, expand the list of applications/application groups/application filters. 2. After selecting the desired applications/application groups/application filters, click → to add them to the right panes. 3. After adding the desired objects, click the blank area in this dialog to complete the application configuration. You can also perform other operations: • To add a new application group, click **New AppGroup**. • To add a new application filter, click **New AppFilter**.

Option	Description
Schedule	Specifies a schedule when the PBR rule will take effect. Select a desired schedule from the **Schedule** drop-down list. After selecting the desired schedules, click the blank area in this dialog to complete the schedule configuration. To create a new schedule, click **New Schedule**.

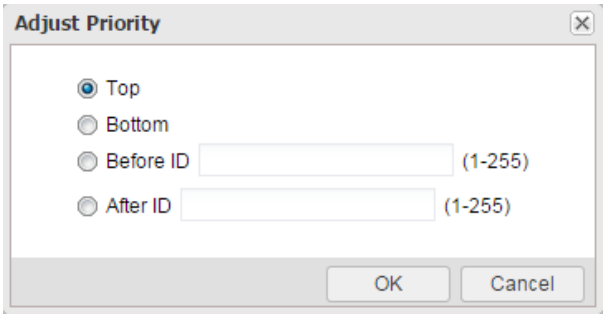
In the Next Hop tab, configure the following.

Option	Description
Set Nest-hop	To specify the type of next hop, click **IP Address**, **Virtual Router in current Vsys**, **Interface**, or **Virtual Router in other Vsys**. • IP Address: Type IP address into the **IP address** text box and specify the weight into the **Weight** text box. When more than one next hops are available, the traffic will be allocated to the different next hops according to the weight value. • Virtual Router in current Vsys: Select a name from the **Next-Hop Virtual Router** drop-down list and specify the weight into the **Weight** text box. When more than one next hops are available, the traffic will be allocated to the different next hops according to the weight value. • Interface: Select an interface from the **Interface** drop-down list and specify the weight into the **Weight** text box. When more than one next hops are available, the traffic will be allocated to the different next hops according to the weight value. • Virtual Router in other Vsys: Check the radio button to specify a virtual router in the current VSYS as the next hop. Select a virtual router from the **Virtual Router** drop-down list and specify the weight into the **Weight** text box. When more than one next hops are available, the traffic will be allocated to the different next hops according to the weight value.
Track Object	Select the track object from the drop-down list. See "Track Object" on Page 235.
Weight	Specifies the weight for the next hop. The value range is 1 to 255. The default value is 1. If a PBR rule is configured with multiple next hops, system will distribute the traffic in proportion to the corresponding weight.
Add	Click to add the specified next hop.
Delete	Select next-hop entries from the next hop table and click this button to delete.

Adjusting Priority of a PBR Rule

To adjust priority of a Policy-based Route rule, take the following steps:

1. Select **Network** > **Routing** > **Policy Based Routing**.
2. From the **Virtual Router** drop-down list, select the Virtual Router for the new route.
3. Select the rule you want to adjust priority from the list below, click **Priority**.
4. In the Adjust Priority dialog box, enter values.



Option	Description
Top	Click this option button to move the PBR rule to the top.
Bottom	Click this option button to move the PBR rule to the bottom.
Before ID	Click this option button and type the ID into the box to move the PBR rule to the position before the ID.
After ID	Click this option button and type the ID into the box to move the PBR rule to the position after the ID.

Note: Each PBR rule is labeled with a unique ID. When traffic flows into a Hillstone device, the device will query for PBR rules by turn, and process the traffic according to the first matched rule. However, the PBR rule ID is not related to the matching sequence during the query. You can move a PBR rule's location up or down at your own choice to adjust the matching sequence accordingly.

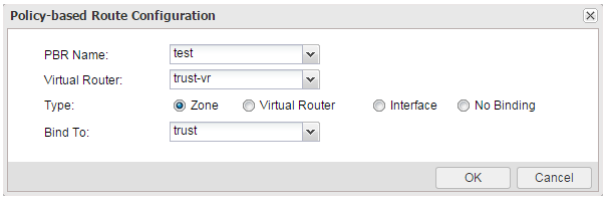
Applying a Policy-based Route

You can apply a policy-based route by binding it to an interface, virtual router or zone.

To apply a policy-based route, take the following steps:

1. Select **Network** > **Routing** > **Policy Based Routing**.
2. From the **Virtual Router** drop-down list, select the Virtual Router for the new route.
3. Click **Bind to**.

   In the Policy-based Route Configuration dialog box, enter values.



Option	Description
PBR Name	Select a route from the PBR name drop-down list.
Virtual Router	From the **Virtual Router** drop-down list, select the Virtual Router for the new route. The default value is "trust-vr".
Type	Specifies the object type that the policy-based route binds to. You can

Option	Description
	select **Zone**, **Virtual Router**, **Interface** or **No Binding**. • Zone: Click this option button and select a zone from the **Zone** drop-down list. • Virtual Router: Click this option button and show the virtual router that the policy-based route binds to. • Interface: Click this option button and select a interface from the **Interface** drop-down list. • No Binding: This policy-based route is no binding.

4. Click **OK**.

DNS Redirect

System supports the DNS redirect funtion, which redirects the DNS requests to a specified DNS server. For more information about specifying IP addresses of the DNS server, see Configuring a DNS Server. Currently, the DNS redirect function is mainly used to redirect the video traffic for load balancing. With the policy based route working together, system can redirect the Web video traffic to different links, improving the user experience.

To enable the DNS redirect function, take the following steps:

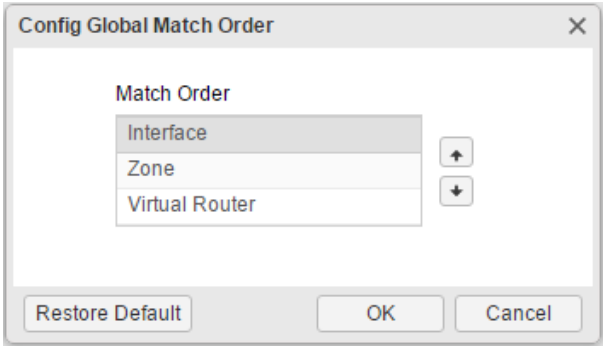
1. Select **Network** > **Routing** > **Policy Based Routing**.
2. Click **Enable DNS Redirect**.

Configuring the Global Match Order

By default, if the PRB rule is bound to both an interface , VRouter and the security zone the interface belongs to, the traffic matching sequence will be: Interface > Zone > VRouter. You can configure the global match order of PBR.

To configure the global match order, take the following steps:

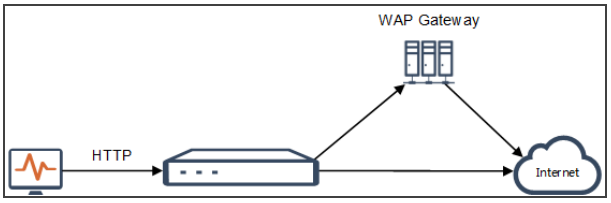
1. Select **Network** > **Routing** > **Policy Based Routing**.
2. Click **Config Global Match Order**.



3. Select the items that need to be adjusted, and click  and .
4. To restore the default matching sequence, click **Restore Default**.
5. Click **OK**.

WAP Traffic Distribution

The WAP traffic distribution function is designed to distribute the HTTP flow through the WAP gateway to relieve the traffic.



As shown in the topology above, the device that enabled WAP traffic distribution is deployed in front of the WAP server. When the HTTP traffic goes through the device, the system analyzes the traffic, and then distributes the flow to the WAP gateway or the Internet according to the configuration of the device. Normally, you will want to distribute your business service traffic to the WAP gateway, and allocate other traffic (e.g. Internet surfing or downloading) to the Internet.

The WAP traffic distribution function adopts a policy-based route rule. When the HTTP traffic of an interface matches a policy-based route rule, system will distribute the traffic to the specified next-hop IP address according to the PBR rule. For the traffic distributed to the Internet, you need to enable the IP replacement function. Because the original destination is the WAP gateway address, to enable accessibility, translating the original address to the actual destination is necessary.

To configure WAP traffic distribution, take the following steps:

- Enabling WAP traffic distribution.
- Configuring a DNS Server.
- Creating Host-book.
- Creating a Policy-based Route Rule.
- Checking WAP traffic distribution statistics.

Enabling WAP Traffic Distribution

To enable WAP traffic distribution on a specified interface, take the following steps:

1. Select Network > Interface and double click the interface you want.
2. Under the Basic tab, select the check box of **WAP traffic distribution**. For more information about the Host-book, see "Configuring an Interface" on Page 12.

Configuring a DNS Server

The DNS server can be used to analyze the real destination IP address. For more information about the DNS server, see "DNS" on page 76. A domain name can correspond to multiple IP addresses, so system can only support the first IP address that is analyzed.

Creating Host Book

To use the WAP traffic distribution function, you need to add a host book into the policy-based route rule. When the HTTP traffic matches the policy-based route rule, system will distribute the traffic to the WAP gateway or the Internet according to the PBR rule and whether the domain entry matches. For more information about the Host-book, see "Host Book" on Page 204.

Creating a Policy-based Route Rule

To apply the host book domain entry in the policy-based route rule, bind the policy-based route rule to the interface that enabled the WAP traffic distribution function. For more information about the policy-based route, see "Policy-based Route" on Page 77.

Viewing WAP Traffic Distribution Statistics

To see WAP traffic distribution statistics, see "WAP Traffic Distribution" on Page 418.

Video Streaming Redirection

You can redirect HTTP video streaming to a designated link to ensure a better streaming speed. The configuration of video streaming redirection combines multiple modules. The configuration logic is introduced here.

To configure video streaming redirection, take the following steps:

1. Configuring application identification: set up traffic control based on the data type.
2. Enabling video streaming redirection: enable WAP traffic distribution and assign the port number used for certain website's HTTP video. IP replacement is not needed.
3. Configuring PBR: Create a policy based route and adding the APP or services for video streaming, then binding this route rule to the interface which enables video streaming redirection.

RIP

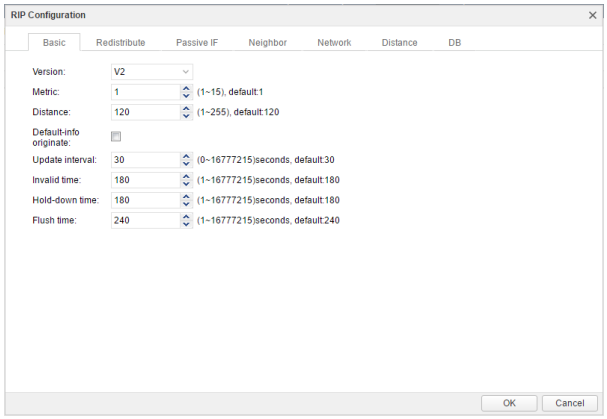
RIP, Routing Information Protocol, is an internal gateway routing protocol that is designed to exchange routing information between routers. Currently, devices support both RIP versions, i.e., RIP-1 and RIP-2.

RIP configuration includes basic options, redistribute, Passive IF, neighbor, network and distance. You will also need to configure RIP parameters for different interfaces, including RIP version, split horizon, and authentication mode.

Creating RIP

To create RIP, take the following steps:

1. Select **Network** > **Routing** > **RIP**.
2. From the **Virtual Router** drop-down list, select the Virtual Router for the new route.
3. Click **New**.



In the Basic tab, configure the following.

Option	Description
Version	Specifies a RIP version. Hillstone devices support RIP-1 and RIP-2. RIP-1 transmits packets by broadcasting, while RIP-2 transmits packet by multicasting. Select a version from the drop-down list. The default version is RIP-2.
Metric	Specifies a default metric. The value range is 1 to 15. If no value is specified, the value of 1 will be used. RIP measures the distance to the destination network by hops. This distance is known as metric. The metric from a router to a directly connected network is 1, increment is 1 for every additional router between them. The max metric is 15, and the network with metric larger than 15 is not reachable. The default metric will take effect when the route is redistributed.
Distance	Specifies a default distance. The value range is 1 to 255. If no value is specified, the value of 120 will be used.
Information originate	Specifies if the default route will be redistributed to other routers with RIP enabled. By default RIP will not redistribute the default route. Select the check box to redistribute the default route.
Update interval	Specifies an interval in which all RIP routes will be sent to all the neighbors. The value range is 0 to 16777215 seconds. The default value is 30.
Invalid time	If a route has not been updated for the invalid time, its metric will be set to 16, indicating an unreachable route. The value range is 1 to 16777215 seconds. The default value is 180.
Holddown time	If the metric becomes larger (e.g., from 2 to 4) after a route has been

Option	Description
	updated, the route will be assigned with a holddown time. During the holddown time, the route will not accept any update. The value range is 1 to 16777215 seconds. The default value is 180.
Flush time	System will keep on sending the unreachable routes (metric set to 16) to other routers during the flush time. If the route still has not been updated after the end of flush time, it will be deleted from the RIP information database. The value range is 1 to 16777215 seconds. The default value is 240.

In the Redistribute tab, configure the following.

Option	Description
Protocol	Select a protocol type for the route from the **Protocol** drop-down list. The type can be Connected, Static, OSPF or BGP.
Metric	Type the metric for the route into the **Metric** box. If no value is specified, system will use the default metric value.
Add	Click **Add** to add the Redistribute route entry. All the entries that have been added will be displayed in the Redistribute Route list below.
Delete	Repeat the above steps to add more Redistribute route entries. To delete a Redistribute route entry, select the entry you want to delete from the list, and click **Delete**.

In the Passive IF tab, configure the following.

Option	Description
Interface	Select a passive interface from the **Interface** drop-down list.
Add	Click **Add** to add the passive interface. All the interfaces that have been added will be displayed in the list below.
Delete	Repeat the above steps to add more Passive IFs. To delete a Passive IF, select the entry you want to delete from the list, and click **Delete**.

In the Neighbor tab, configure the following.

Option	Description
Neighbor IP	Type the neighbor IP into the **Neighbor IP** box.
Add	Click **Add** to add the neighbor IP. All the neighbor IPs that have been added will be displayed in the list below.
Delete	Repeat the above steps to add more neighbor IPs. To delete a neighbor IP, select the entry you want to delete from the list, and click **Delete**.

In the Network tab, configure the following.

Option	Description
Network(IP/netmask)	Type the IP address and netmask into the **Network(IP/netmask)** box.
Add	Click **Add** to add the network. All the networks that have been added will be displayed in the list below.
Delete	Repeat the above steps to add more networks. To delete a network, select the entry you want to delete from the list, and click **Delete**.

In the Distance tab, configure the following.

Option	Description
Distance	Type the distance into the **Distance** box. The priority of the specified distance is higher than than the default distance.
Network(IP/netmask)	Type the IP prefix and netmask into the **Network(IP/netmask)** box.
Add	Click **Add** to add the distance. All the distances that have been added will be displayed in the list below.
Delete	Repeat the above steps to add more distances. To delete a distance, select the entry you want to delete from the list, and click **Delete**.

In the DB tab, view the database of the RIP route .

All the route entries that can reach target network are stored in the database.

4. Click **OK**.

Note: Configuration for RIP on Hillstone device's interfaces includes: RIP version, split horizon and authentication mode. For more information on how to configure RIP on an interface, see "Configuring an Interface" on Page 12.

Chapter 5 Authentication

Authentication is one of the key features for a security product. When a security product enables authentication, the users and hosts can be denied or allowed to access certain networks.

From a user's point of view, authentication is divided into the following categories:

- If you are a user from an internal network who wants to access the Internet, you can use:
  - "Web Authentication" on Page 89
  - "Single Sign-On" on Page 96
  - "PKI" on Page 112
- If you are a user from the Internet who wants to visit an internal network (usually with VPN), you can use:
  - "SSL VPN" on Page 137
  - "IPSec VPN" on Page 118 (IPSec VPN (with radius server)+Xauth)
  - "L2TP VPN" on Page 196 (L2TP over IPsec VPN)

Authentication Process

A user uses his/her terminal to connect to the firewall. The firewall calls the user data from the AAA server to check the user's identity.

- User (authentication applicant): The applicant initiates an authentication request, and enters his/her username and password to prove his/her identity.
- Authentication system (i.e. the firewall in this case):The firewall receives the username and password and sends the request to the AAA server. It is an agent between the applicant and the AAA server.
- "AAA Server" on Page 217: This server stores user information like the username and password, etc. When the AAA server receives a legitimate request, it will check if the applicant has the right to the user network services and send back the decision. For more information, refer to "AAA Server" on Page 217. AAA server has the following four types:
  - Local server
  - Radius server
  - LDAP server
  - AD server
  - TACACS+server

Web Authentication

Web authentication is used to identify the user who wants to visit the Internet. When Web authentication is enabled, the browser on the PC which is trying to access the Internet will show a login request. You need to input your user-name and password. When your information is correct, system will allocate your PC and IP address and give you a role that controls your authority.

- General Web authentication (WebAuth): a general Web authentication means that an authentication page will appear to check your information.
- "Single Sign-On" on Page 96: Single Sign On is a simplified WebAuth method. The authentication applicant will not be required to open an authentication page. When a user is a legitimate applicant in the AAA server, he/she can pass the identification automatically. For SSO, the AAA server type must be Active Directory server.

Using WebAuth Wizard

WebAuth wizard is the most convenient way to configure WebAuth.

The prerequiste for using the wizard is that you have already added AAA server in system and users are also added in that AAA server (refer to "AAA Server" on Page 217).

1. Select **Network > WebAuth > WebAuth**.
2. Click **WebAuth Wizard** on the right top corner.

3. In the prompt, complete the following steps.

Follow the steps in the wizard to complete authentication settings.

Parameters	
Mode	Specify an authentication methods: HTTP , HTTPS or NTLM. • If you select **HTTP** or **HTTPS**, the auth user will be required to enter his/her username and password. HTTP and HTTPS indicate the protocol when transmitting the user's credentials between the client and the AAA server. HTTPS is encrypted, and can avoid information leakage. • If you select **NTLM**, auth user will not need to open an authen-

Parameters	
	tication page. System gets the user's PC login credential and send it to AAA server.
Auth User	
AAA Server	Specify the AAA server. Make sure that your selected AAA server has already set up all of the user's credentials and the server has been added in StoneOS system. Refer to "AAA Server" on Page 217.
Policy	
Src Zone	Specify the source zone where auth users are from.
Dst Zone	Specify the destination zone where the auth users will visit.
DNS Zone	Specify the DNS zone.
When you click OK, system will automatically generate three security policies which are used for web auth. If you wish to customize some parts of this authentication process, like limit accessing time, you can modify the security policies. Refer to "Security Policy" on Page 281 .	

4. Click **OK**.

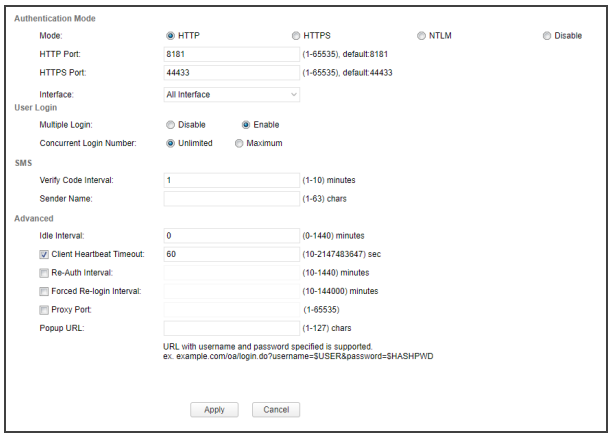
After WebAuth is configured, the users who matched the WebAuth policy are recommended to input the correct username and password, and then the users can access the network. System takes actions to avoid illegal users from getting usernames and passwords by brute-force. If one fails to log in through the same host three times in two minutes, that host will be blocked for 2 minutes.

Configuring Global Parameters for WebAuth

Global parameters apply to all WebAuth polices.

To configure WebAuth global parameters, take the following steps:

1. Select **Network > WebAuth > WebAuth**.



2. Under the WebAuth tab, select the radio button of the authentication method you want.

Under different mode, the configuration options will vary.

Authentication Mode	
Mode	Specify an authentication methods: HTTP, HTTPS or NTLM. • If you select **HTTP** or **HTTPS**, the auth user will be required to enter his/her username and password. HTTP and HTTPS indicate the protocol when transmitting user's credential between the client and the AAA server. HTTPS is encrypted, and can avoid information

Authentication Mode	
	leakage. • If you select **NTLM**, auth user will not need to open an authentication page. System gets the user's PC login credential and send it to AAA server. Refer to "NTLM Authentication" on Page 92. • If you do not allow webauth, select **Disable**.
HTTP port	Specifies the HTTP protocol transmission port number of the authentication server. The range is 1 to 65535, and the default value is 8181.
HTTPS port	Specifies the HTTPS protocol transmission port number of the authentication server. The range is 1 to 65535, and the default value is 44433.
HTTPS trust domain	Specifies the HTTPS trust domain. This domain is previously created in PKI and has imported international CA certified certificate.
When NTLM Fails	This option is used for NTLM authentication. It will define the next action when user fails to pass SSO login. Select **Use HTTP Mode**, and the next step is to use HTTP web-auth to continue authentication. Select **Deny**, and the users will fail to login in.
User Login	
Multiple login	If you disable multiple login, one account cannot login if it has already logged in elsewhere. You can choose to kick out the first login visitor or you can disable the second login. If you allow multiple login, more than one clients can login with the same account. But you can still set up the maximum number of clients using one account.
SMS	
Verification Code Interval	When using SMS authentication, users need to use the SMS verification code received by the mobile phone, and the verification code will be invalid after the timeout value reaches. After the timeout value reaches, if the verification code is not used, you needs to get the new SMS verification code again. Specifies the verification code interval, the range is 1 to 10 minutes. The default value is 1 minute.
Sender Name	The user can specify a message sender name to display in the message content. Specifies the sender name. The range is 1 to 63.  **Note:** Due to the limitation of UMS enterprise information platform, when the the SMS gateway authentication is enabled, the sender name will be displayed on the name of the UMS enterprise information platform.
Advanced	
Idle interval	The maximum time length of an inactive account after it has logs in.
Client Heartbeat Timeout	When the authenticator sends a request to ask the client to submit his/her username, the client need to respond within a specified period. If the client does not respond before timeout, system will resend the

Authentication Mode	
	authentication request message.
Re-Auth Interval	When the client is authorized to access network, the authenticator can re-authenticate the client.
Forced Re-login Interval	If the forced re-login function is enabled, users must re-login after the configured interval ends.
Proxy Port	Specify the port number for HTTPS, HTTPS and SSO proxy server. The port number applies to all. If it changes in any page, the other mode will also use the new port. The range is 1 to 65535.
Popup URL	The popup URL function redirects the client to the specified URL after successful authentication. You need to turn off the pop-up blocker of your web browser to ensure this function can work properly. The format of URL should be "http://www.abc.com" or "https://www.abc.com".

Note:

- If the WebAuth success page is closed, you can log out not only by timeout, but also by visiting the WebAuth status page (displaying online users, online times and logout button). You can visit it through "http(https):// IP-Address: Port-Number". In the URL, IP-Address refers to the IP address of the WebAuth interface, and Port-Number refers to HTTP/HTTPS port. By default, the HTTP port is 8181, the HTTPS port is 44433. The WebAuth status page will be invalid if there are no online users on the client or the WebAuth is disabled.
- You can specify the username and password in the URL address. When the specified redirect URL is the application system page with the authentication needed in the intranet, you do not need the repeat authentication and can access the application system. The corresponding keywords are $USER, $PWD, or $HASHPWD. Generally, you can select one keyword between $PWD and $HASHPWD. The formart of the URL is "URL" +"username=$USER&password=$PWD".
- When entering the redirect URL in CLI, add double quotations to the URL address if the URL address contains question mark. For example, "http://192.10.5.201/oa/-login.do?username=$USER&password=$HASHPWD"

3. Click **Apply**.

NTLM Authentication

This method still needs to trigger the browser, and the browser will send user information to the AD server automatically.

The configuration of NTLM is the same with WebAuth, refer to "Using WebAuth Wizard" on Page 89. After finishing the WebAuth wizard, take the following two steps for NTLM:

Step 1: Configuring NTLM for StoneOS

1. Select **Network > WebAuth > WebAuth** to enter the WebAuth page.

2. **Select the NTLM radio button, the following parameters appear:**

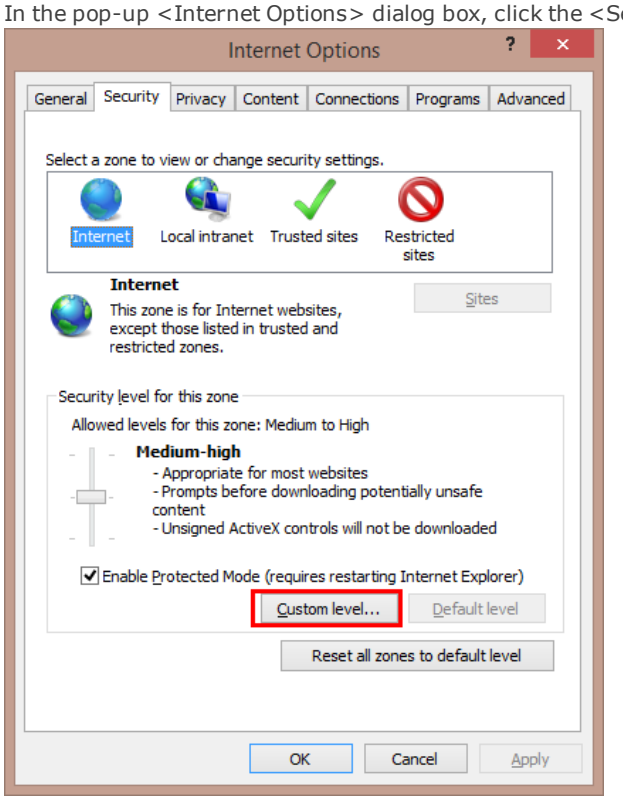
Authentication Mode	
When NTLM fails	If you select **Use HTTP Mode**, when a user fails to authenticate through NTLM, the user still can manually input user name and password in the browser page to authenticate again.
User Login	
Multiple login: Disable	• If select **Replace**, system only permits one user login, the user logged in will be kicked out by the user logging in. • If select **Refuse New Login**, system will disable the same user to log in again.
Multiple login: Enable	• If select **Unlimited**, system will not limit the concurrent login number of the same user. • If select **Maximum**, system will configure the maximum concurrent login number of the same user.
Advanced	
Idle interval	The longest time that the authentication user can keep online without any traffic.
Force Re-login Interval	The time interval that system forces the login user to authenticate again.
Proxy port	Specifies the proxy port number of SSO proxy server. The range is 1 to 65535.

3. Click **Apply**.

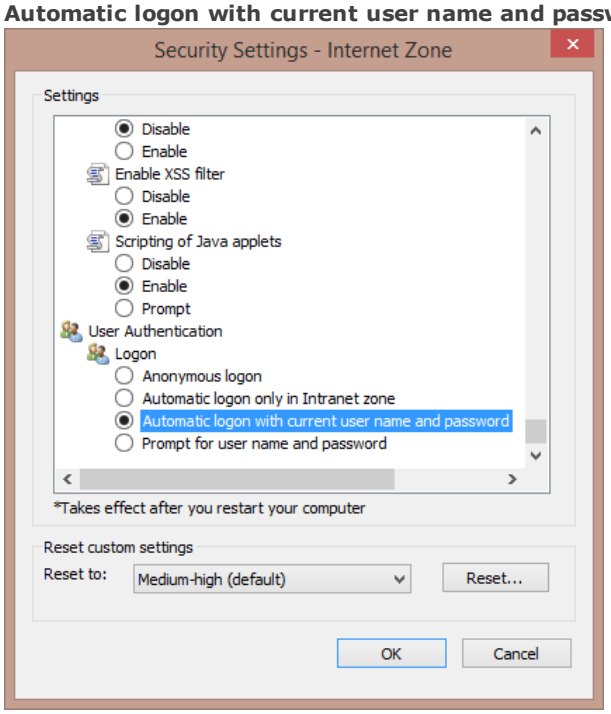
Step 2: Configuring settings for User Browser

1. On the PC terminal of a user , open a browser (take IE as an example).
2. On the menu bar of IE browser, select **Tools > Internet options**.

3. In the pop-up <Internet Options> dialog box, click the <Security> tab, and click **Custom level...**.



4. In the pop-up <Security Settings - Internet Zone> dialog box, enter **User Authentication>Logon** and select **Automatic logon with current user name and password**.

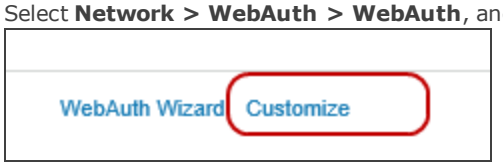


5. Click **OK**.

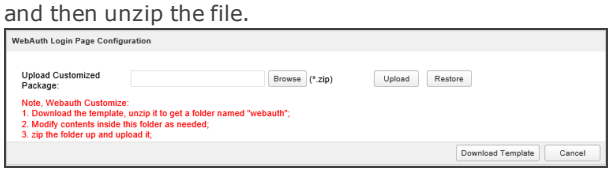
Modifying WebAuth Page

The WebAuth page is the redirected page when an authenticated user opens the browser. By default, you need to enter his/her username and password in the WebAuth page. If you select the SMS mode, you need to enter the phone number and SMS code in the WebAuth page.

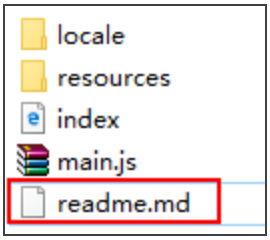
1. Select **Network > WebAuth > WebAuth**, and click **Customize** on the right top corner.



2. In the prompt, click **Download Template** to download the zip file "webauth" of the default WebAuth login page, and then unzip the file.



3. Open the source file and modify the content(including style, picture, etc.)according to the requirements. For more detailed information, see the file of **readme.md**.



4. Compress the modified file and click **Upload** to upload the zip file to system.

Note:

- The WebAuth login page you already specified will be invalid after you upgrade the version from the old to 5.5R5.
- The zip file should comply with the following requirements: the file format should be zip; the maximum number of the file in the zip file is 50; the upper limit of the zip file is 1M; the zip file should contain "index.html".
- System can only save one file of the default template page and the customized page. When you upload the new customized page file, the old file will be covered. You are suggested to back up the old file.

Single Sign-On

When the user authenticates successfully for one time, system will obtain the user's authentication information. Then the user can access the Internet without authentication later.

SSO can be realized through three methods, which are independent from each other, and they all can achieve the "no-sign-on"(don't need to enter a user name and password) authentication.

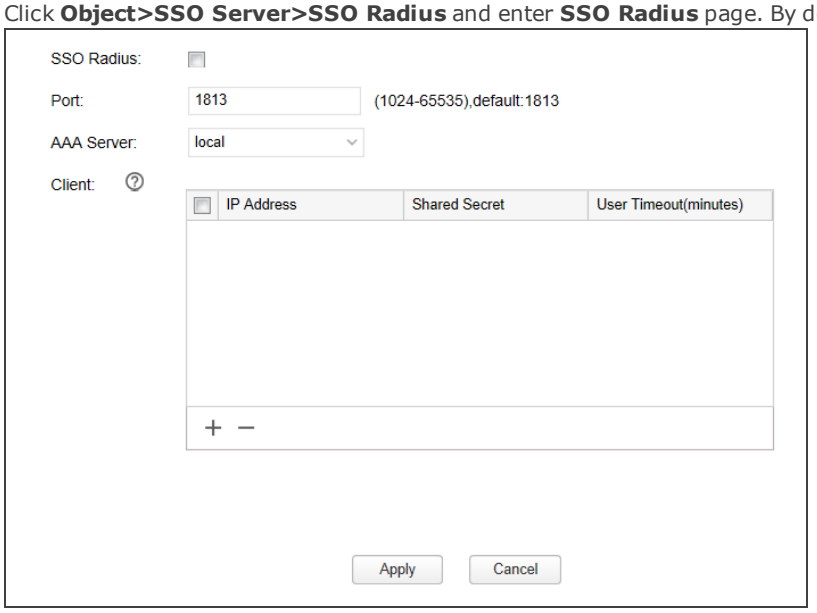
Method	Installing Software or Script	Description
SSO Radius	---	After enabling SSO Radius function, system can receive the accounting packets that based on Radius standard protocol. System will obtain user authentication information, update online user information and manage user's login and logout according to the packets.
AD Scripting	Logonscript.exe	This method needs to install the script "Logonscript.exe" on the AD server. The triggered script can also send user information to StoneOS. This method is recommended if you have a higher accuracy requirement for statistical monitoring and don't mind to change the AD server.
AD Polling	---	After enabling the AD Polling function, system will regularly query the AD server to obtain the login user information and probe the terminal PC to verify whether the users are still online, thus getting correct authentication user information to achieve SSO. This method is recommended if you don't want to change the AD server.
SSO Monitor	---	After enabling SSO Monitor, StoneOS will build connection with the third-party authentication server through SSO-Monitor protocol, as well as obtain user online status and information of the group that user belongs to. System will also update the mapping information between user name and IP in real time for online user.
AD Agent	AD Security Agent	This method needs to install AD Security Agent software on the AD server or other PCs in the domain. The software can send user information to StoneOS. This method is recommended if you don't want to change the AD server.

Enabling SSO Radius for SSO

After enabling SSO Radius function, system can receive the accounting packets that based on Radius standard protocol. System will obtain user authentication information, update online user information and manage user's login and logout according to the packets.

To configure the SSO Radius function, take the following steps:

1. Click **Object>SSO Server>SSO Radius** and enter **SSO Radius** page. By default, SSO Radius is disabled.



2. Click  checkbox to enable the SSO Radius function.
3. Specify the Port to receive Radius packets for StoneOS (Don't configure port in non-root VSYS). The range is 1024 to 65535. The default port number is 1813.
4. Specify the AAA Server that user belongs to. You can select the configured Local, AD or LDAP server. After selecting the AAA server, system can query the corresponding user group and role information of the online user on the referenced AAA server, so as to realize the policy control based on the user group and role.
5. Specify the IP Address, Shared Secret and Idle Interval of SSO Radius client which is allowed to access system. You can configure up to 8 clients.
   - IP Address: Specify the IPv4 address of SSO Radius client. If the IPv4 address is 0.0.0.0, it means that system receives the packets sent from any Radius client.
   - Shared Secret: Specify the shared secret key of SSO Radius client. The range is 1 to 31 characters. System will verify the packet by the shared secret key, and parse the packet after verifying successfully. If system fails to verify the packet, the packet will be dropped. The packet can be verified successfully only when SSO Radius client is configured the same shared secret key with system or both of them aren't configured a shared secret key.
   - User Timeout(minutes): Configure the idle interval for the authentication information of Radius packet in the device. If there's no update or delete packet of the user during the idle interval, the device will delete the user authentication information. The range is 0 to 1440 minutes. The default value is 30. 0 means the user authentication information will never timeout.
6. Click **Apply** button to save all the configurations.

Using AD Scripting for SSO

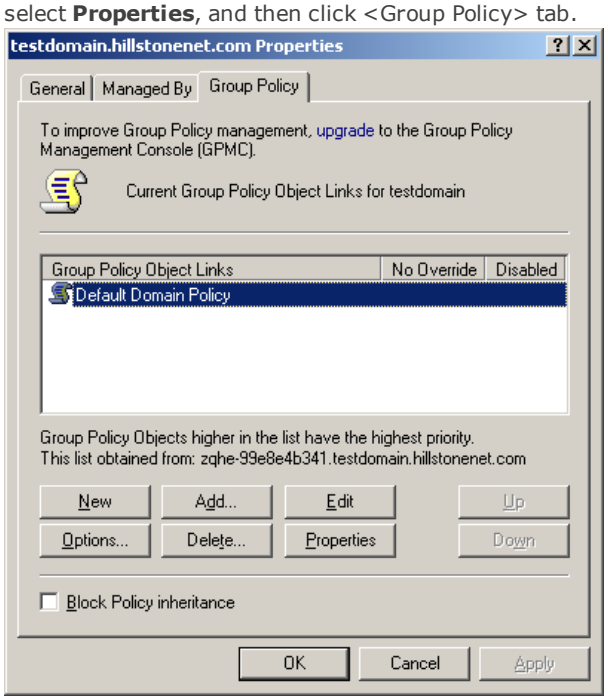
Before using a script for SSO, make sure you have established your Active Directory server first. To use a script for SSO, take the following steps:

Step 1: Configuring the Script for AD Server

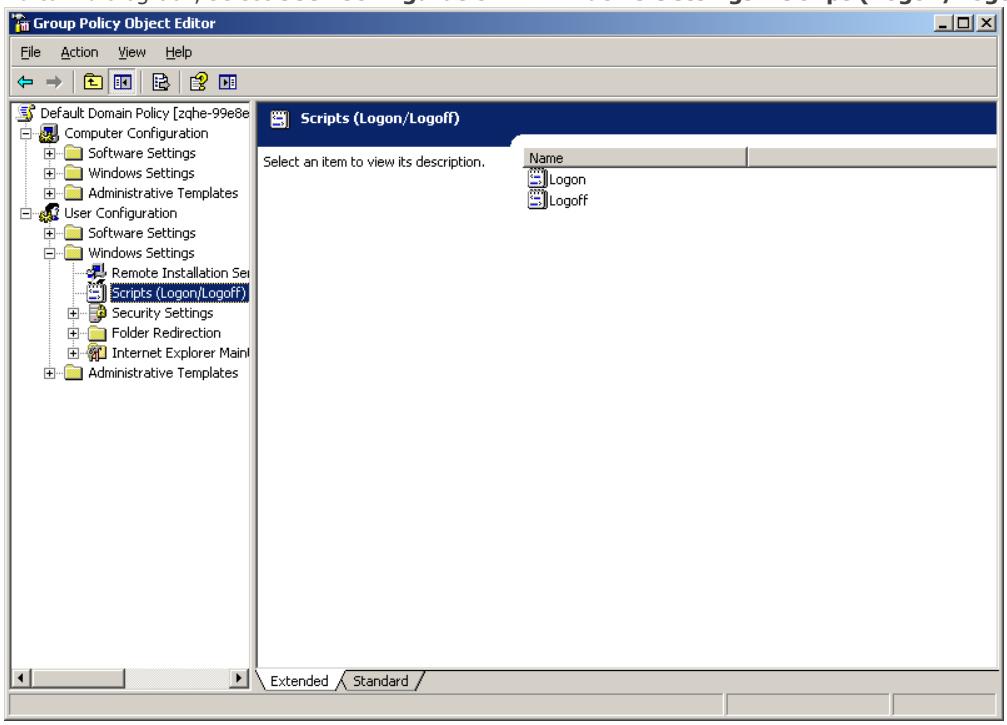
1. Open the AD Security Agent software(for detailed information of the software, see Using AD Agent Software for SSO). On the <AD Scripting> tab, click **Get AD Scripting** to get the script "Logonscript.exe" , and save it in a directory where all domain users can access.

2. In the AD server, enter **Start** menu, and select **Mangement Tools > Active Directory User and Computer**.

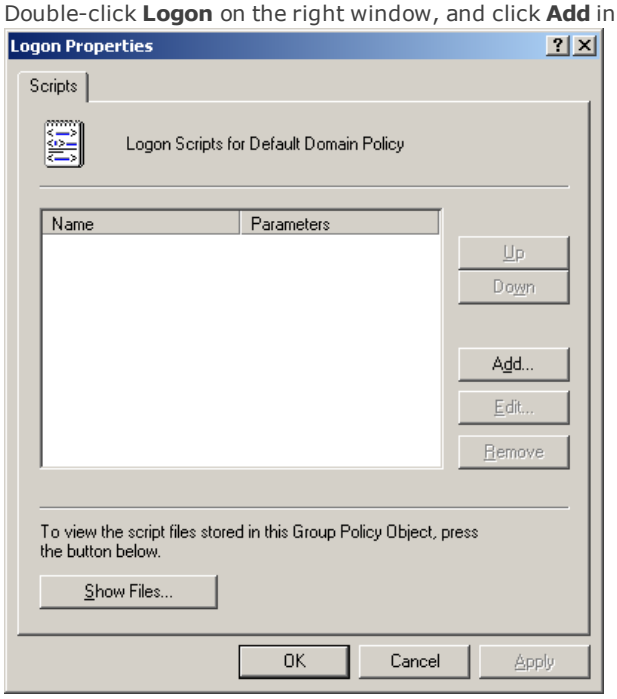
3. In the pop-up <Active Directory User and Computer> dialog box, right-click the domain which will apply SSO to select **Properties**, and then click <Group Policy> tab.



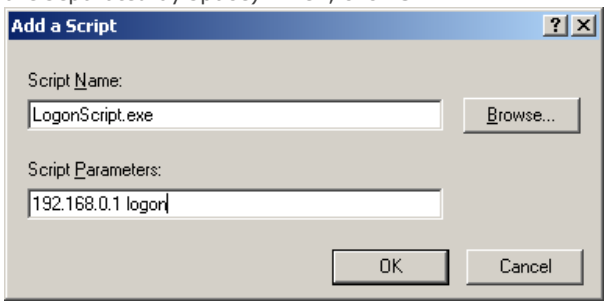
4. In the Group Policy list, double-click the group policy which will apply SSO. In the pop-up <Group Policy Object Editor>dialog box, select **User Configuration > Windows Settings> Script (Logon/Logout)**.



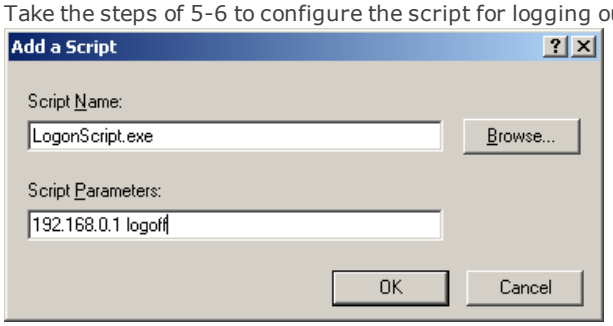
5. Double-click **Logon** on the right window, and click **Add** in the pop-up <logon properties> dialog box.



6. In the <Add a Script> dialog box, click **Browse** to select the logon script (logonscript.exe) for the Script Name; enter the authentication IP address of StoneOS and the text "logon" for the Script Parameters(the two parameters are separated by space). Then, click **OK**.



7. Take the steps of 5-6 to configure the script for logging out, and enter the text "logoff" in the step 6.



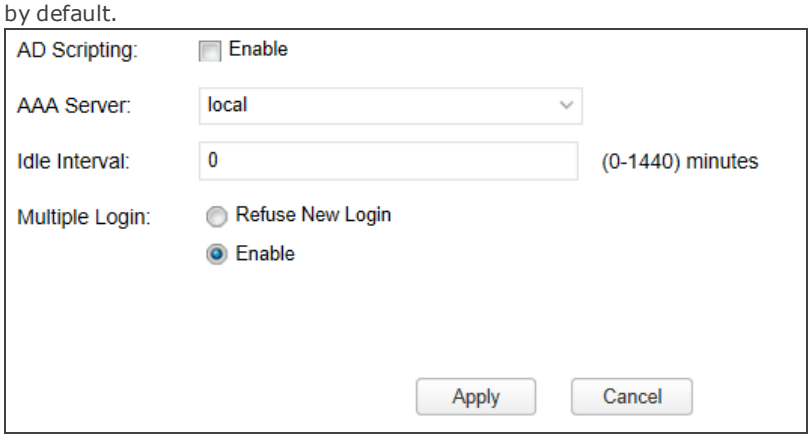
Note: The directory of saving the script should be accessible to all domain users, otherwise, when a user who does not have privilege will not trigger the script when logs in or out.

Step 2: Configuring AD Scripting for StoneOS

After the AD Scripting is enabled, the user can log in Hillstone device simultaneously when logging in the AD server successfully. System only supports AD Scripting of Active Directory server.

To configure the AD Scripting function, take the following steps:

1. Click **Object> SSO Server> AD Scripting** to enter the AD Scripting page. The AD Scripting function is disabled by default.



2. Select the **Enable** check box of AD Scripting to enable the function.
3. Specify the AAA Server that user belongs to. You can select the configured Local, AD or LDAP server. After selecting the AAA server, system can query the corresponding user group and role information of the online user on the referenced AAA server, so as to realize the policy control based on the user group and role.
4. Specify the Idle Interval, which specifies the longest time that the authentication user can keep online without any traffic. After the interval timeout, StoneOS will delete the user authentication information. The value range is 0 to 1440 minutes. 0 means always online.
5. Allow or disable users with the same name to log in depends on needs.
   - **Enable**: Click to permit the user with the same name to log in from multiple terminals simultaneously.
   - **Refuse New Login**: Click to permit only one user with the same name to log in, and the user logged in will be kicked out by the user logging in.
6. Click **Apply** to save the changes.

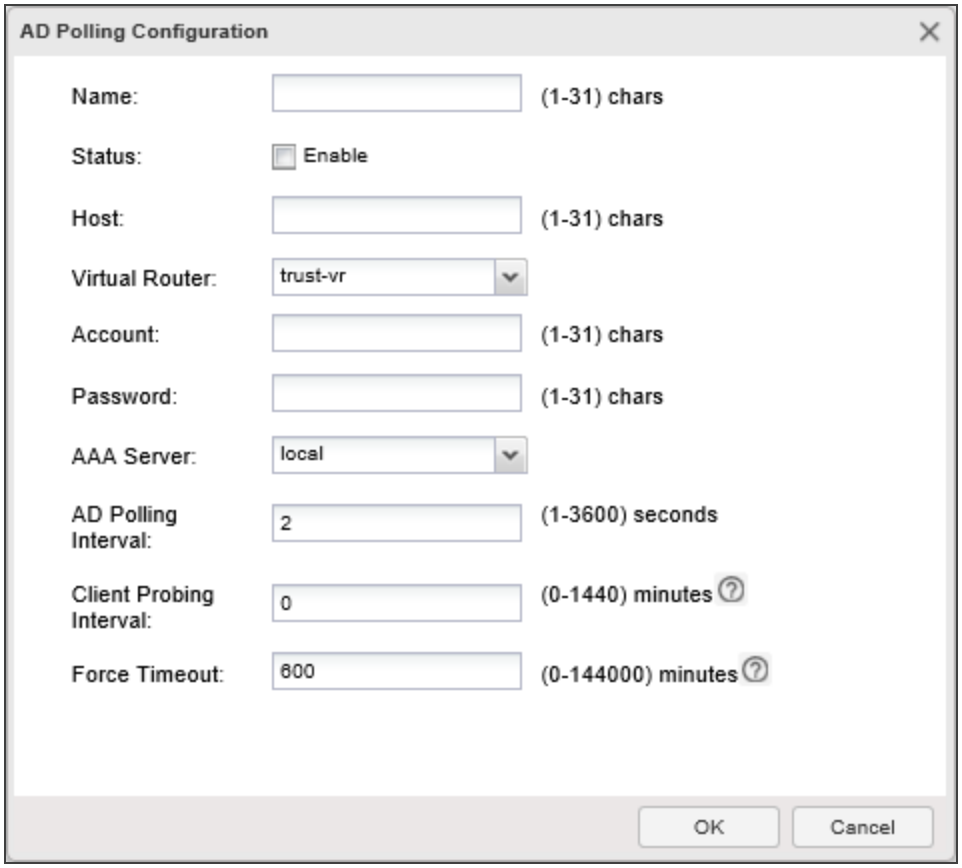
After completing the above two steps, the script can send the user information to StoneOS in real time. When users log in or out, the script will be triggered and send the user behavior to StoneOS.

Using AD Polling for SSO

When the domain user logs in the AD server, the AD server will generate login logs. After enabling the AD Polling function, system will regularly query the AD server to obtain the user login information and probe the terminal PCs to verify whether the users are still online, thus getting correct authentication user information to achieve SSO.

Before using AD Polling for SSO, you should make sure that the Active Directory server is set up first. To use AD Polling for SSO, take the following steps:

1. Click **Object>SSO Client>AD Polling** to enter the AD Polling page.
2. Click the + New button on the upper left corner of the page, and the **AD Polling Configuration** dialog box pops up.



In the AD Polling Configuration dialog box, configure the following:

Option	Description
Name	Specifies the name of the new AD Polling profile. The range is 1 to 31 characters
Status	Click **Enable** checkbox to enable the AD Polling function. After enabling, system will query the AD server to obtain the user information and probe the terminal PC to verify whether the online users are online regularly. When queries for the first time, system will obtain the online user information on the AD server in the previous 8 hours . If fails to obtain the previous information, system will obtain the following online user information directly.
Host	Enter the IP address of authentication AD server in the domain. You can only select AD server. After specifying the authentication AD server, when the domain users log in the AD server, the AD server will generate the login logs. The range is 1 to 31 characters.
Virtual Router	Select the virtual router that the AD server belongs to in the drop-down list.
Account	Enter a domain user name to log in the AD server. The format is domain\username, and the range is 1 to 63 characters. The user is required to have permission to query security logs on the AD server, such as the user of Administrator whose privilege is Domain Admins on the AD server.

Option	Description
Password	Enter a password corresponding to the domain user name. The range is 1 to 31 characters.
AAA Server	Select the referenced AAA server in the drop-down list. You can select the configured Local, AD or LDAP server, see "AAA Server" on Page 217. You are suggested to select the configured authentication AD server. After selecting the AAA server, system can query the corresponding user group and role information of the online user on the referenced AAA server, so as to realize the policy control based on the user group and role,.
AD Polling Interval	Configure the interval for regular AD Polling probing. System will query the AD server to obtain the online user information at interval. The range is 1 to 3600 seconds, and the default value is 2 seconds. You are suggested to configure 2 to 5 seconds to ensure to obtain online user information in real time.
Client Probing Interval	Configure the interval for regular client probing. System will probe whether the user is still online through WMI at interval, and kick out the user if cannot be probed. The range is 0 to 1440 minutes, and the default value is 0 minute(the function is disabled). You are suggested to configure a larger probing interval to save the system performance, if you have low requirements for the offline users.
Force Timeout	Configure the forced logout time. When the user's online time exceeds the configured timeout time, system will kick out the user and force the user to log out. The range is 0 (the function is disabled) to 144000 minutes, and the default value is 600 minutes.

3. Click **OK** button to finish the configuration of AD Polling.

Note:

- When system is restarted or the configuration of AD Polling (except the account, password and force timeout) is modified, system will clear the existed user information and obtain the user information according to the new configuration.
- To realize the AD Polling function, you need to enable the WMI of the PC where the AD server is located and the terminal PC. By default, the WMI is enabled. To enable WMI, you need to enter the **Control Panel >Administrative Tools> Services** and enable the WMI performance adapter.
- To enable WMI to probe the PC where the AD server is located and the terminal PCs, the RPC service and remote management should be enabled. By default, the RPC service and remote management is enabled. To enable the RPC service, you need to enter the **Control Panel >Administrative Tools> Services** and open the Remote Procedure Call and Remote Procedure Call Locator; to enable the remote management, you need to run the command prompt window (cmd) as administrator and enter the command **netsh firewall set service RemoteAdmin**.
- To enable WMI to probe the PC where the AD server is located and the terminal PCs, the PC should permit WMI function to pass through Windows firewall. Select **Control Panel**

>System and Security> Windows Firewall >Allow an APP through Windows Firewall, in the **Allowed apps and features** list, click the corresponding check box of Domain for Windows Management Instrumentation (WMI) function.

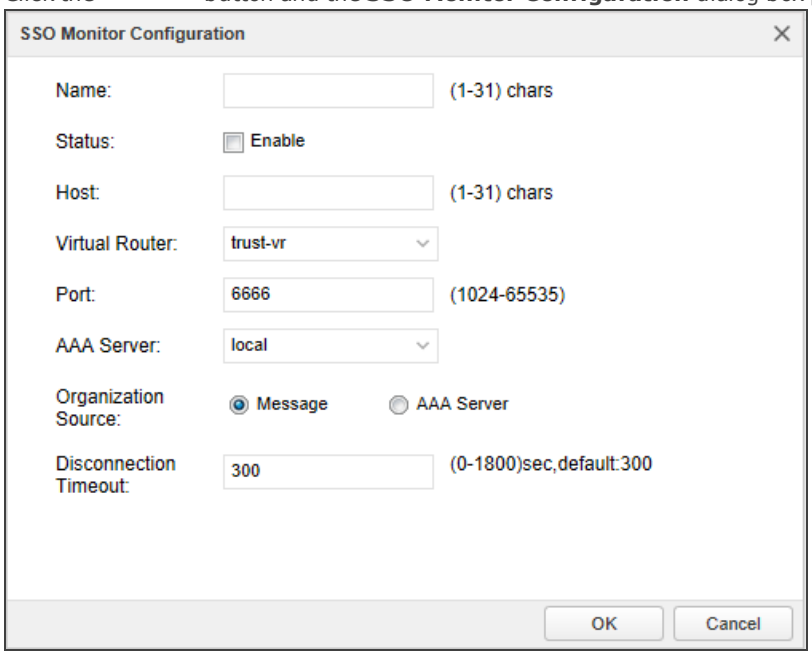
- To use the offline function, you should make sure that the time of the PC where the AD server is located and the terminal PCs is the same. To enable the function of Synchronize with an Internet time server, select **Control Panel > Clock, Language, and Region > Date and Time**, and the Date and Time dialog box pops up. Then, click **Internet Time** tab, and check **Synchronize with an Internet time server**.

Using SSO Monitor for SSO

When user logs in through the third-party authentication server, the authentication status will be saved on the server. StoneOS will build connection with the third-party authentication server through SSO-Monitor protocol, as well as obtain user online status and information of group that user belongs to.

To use SSO Monitor for SSO, take the following steps:

1. Click **Object>SSO Client>SSO Monitor** to enter **SSO Monitor** page.
2. Click the New button and the **SSO Monitor Configuration** dialog box pops up.



In the SSO Monitor Configuration dialog box, configure the following:

Name	Specify the name of the new SSO Monitor. The range is 1 to 31 characters.
Status	Click **Enable** checkbox to enable the SSO Monitor function. After enabling the function, system will build connection with the third-party authentication server through SSO-Monitor protocol, as well as obtain user online status and information of group that user belongs to. The machine will generate authentication user according to the authentication information.
Host	Enter the IP address of the authentication server. The range is 1 to 31 characters. You can select the third-party custom authentication server which supports SSO-Monitor protocol. After specifying the authentication server, when user logs in the specified server, the server will save user's authentication information.
Virtual Router	Select the virtual router that the authentication server belongs to in the drop-down list.
Port	Specifies the port number of the third-party authentication server. System will obtain user information through the port number. The default number is 6666. The range is 1024 to 65535.
AAA Server	Select the referenced AAA server in the drop-down list. You can select the configured Local, AD or LDAP server, see "AAA Server" on Page 217 for configuration method. After selecting the AAA server, system can query the corresponding user group and role information of the online user on the referenced AAA server, so as to realize the policy control based on the user group and role.
Organization Source	Select the method to synchronize user organization structure with system, including Message and AAA Server. When Message is selected, StoneOS will use the user group of authentication information as the group that user belongs to. It's usually used in the scenario of the third-party authentication server saving user group. When AAA Server is selected, StoneOS will use the user organization structure of AAA server as the group that user belongs to. It's usually used in the scenario of the third-party authentication server being authenticated by AAA server and the user organization structure being saved in the AAA server.
Disconnection Timeout	Configure the disconnection timeout. When StoneOS disconnects with the third-party authentication server due to timeout, system will wait during the disconnection timeout. If system still fails to connect within the configured time, it will delete online users. The range is 0 to 1800 seconds. The default value is 300. 0 means the user authentication information will never timeout.

3. Click **OK** button to finish SSO Monitor configuration.

Note: You can configure different numbers of SSO Monitor on different servers. When the configured number exceeds the limit, system will pops up the alarm information.

Using AD Agent Software for SSO

Before using AD Security Agent for SSO, make sure you have established your Active Directory server first. To use AD Security Agent for SSO, take the following steps:

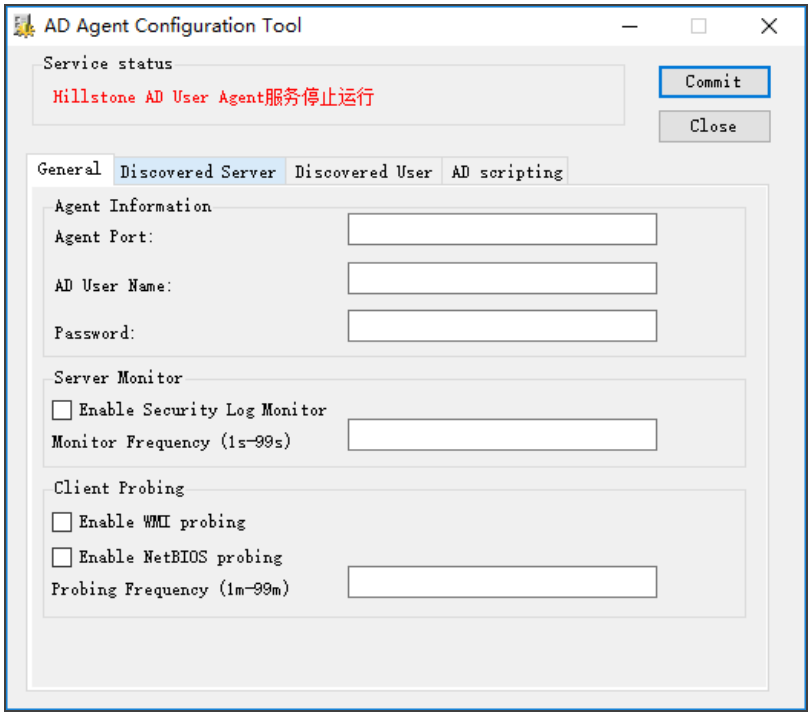
Step 1: Installing and Running AD Security Agent on a PC or Server

AD Security Agent can be installed on an AD server or a PC in the domain. If you install the software on an AD server, the communication only includes "AD Security Agent → StoneOS"; If you install the software on a PC in the domain, the communication includes both process in the following table. The default protocol and port used in the communication are described as follows:

Communication direction		AD Security Agent→AD Server	AD Security Agent→StoneOS
Protocol		TCP	TCP
Port	StoneOS	---	6666
	AD Security Agent	1935、1984	6666
	AD Server	445	---

To install the AD Security Agent to an AD server or a PC in the domain, take the following steps:

1. Click http://swupdate.hillstonenet.com:1337/sslvpn/download?os=windows-adagent to download an AD Security Agent software, and copy it to a PC or a server in the domain.
2. Double-click `ADAgentSetup.exe`to open it and follow the installation wizard to install it.
3. Start AD Security Agent through one of the two following methods:
   - Double-click the `AD Agent Configuration Tool` shortcut on the desktop.
   - Click **Start** menu, and select **All app > Hillstone AD Agent >AD Agent Configuration Tool**.
4. Click the <General> tab.



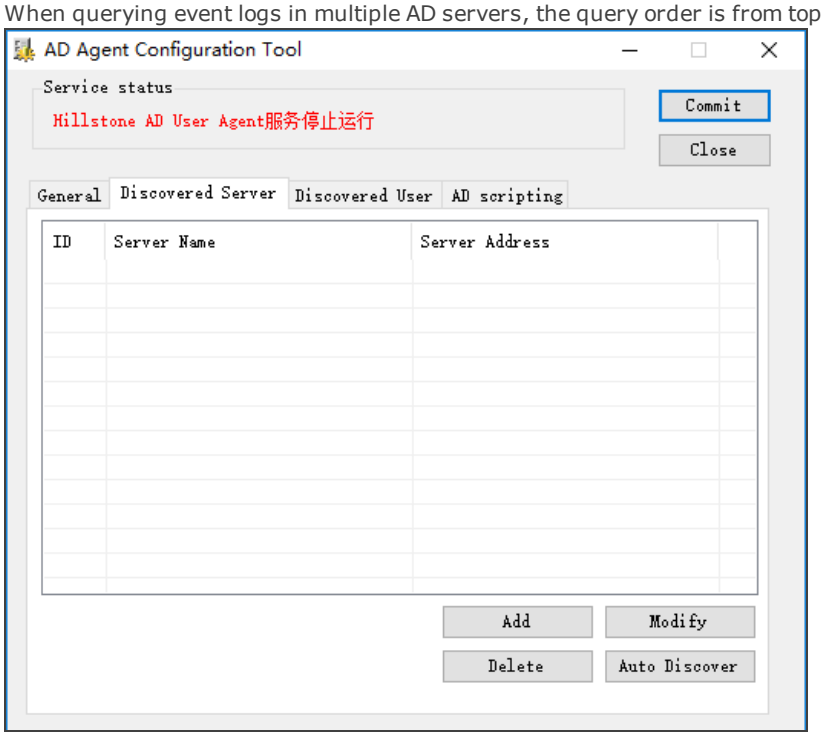
On the <General> tab, configure these basic options.

Option	Description
Agent Port	Enter agent port number. AD Security Agent uses this port to communicate with StoneOS. The range is 1025 to 65535. The

Option	Description
	default value is 6666. This port must be the same with the configured monitoring port in StoneOS, otherwise, the AD Security Agent and StoneOS cannot communicate with each other.
AD User Name	Enter user name to log in the AD server. If AD Security Agent is running on the other PCs of the domain, this user should have high privilege to query event logs in AD server, such as the user of Administrator whose privilege is Domain Admins on AD server.
Password	Enter the password that matched with the user name. If the AD Security Agent is running on the device where the AD server is located, the user name and password can be empty.
Server Monitor	
Enable Security Log Monitor	Select to enable the function of monitoring event logs on AD Security Agent. The default query interval is 5 seconds. The function must be enabled if the AD Security Agent is required to query user information.
Monitor Frequency	Specifies the polling interval for querying the event logs on different AD servers. The default value is 5 seconds. When finishing the query of a AD server, the AD Security Agent will send the updated user information to system.
Client probing	
Enable WMI probing	Select the check box to enable WMI probing. • To enable WMI to probe the terminal PCs, the terminal PCs must open the RPC service and remote management. To enable the RPC service, you need to enter the **Control Panel >Administrative Tools> Services** and open the Remote Procedure Call and Remote Procedure Call Locator; to enable the remote management, you need to run the command prompt window (cmd) as administrator and enter the command **netsh firewall set service RemoteAdmin**. • WMI probing is an auxiliary method for security log monitor. which will probe all IPs in Discovered Users list. When the probed domain name does not match with the stored name, the stored name will be replaced by the probed name.
Probing Frequency	Specifies the interval of active probing action. The range is 1 to 99 minutes and the default value is 20 minutes.

5. On the <Discovered Server> tab, click **Auto Discover** to start automatic scanning the AD servers in the domain. Besides, you can click **Add** to input IP address of server to add it manually.

When querying event logs in multiple AD servers, the query order is from top to bottom in the list.



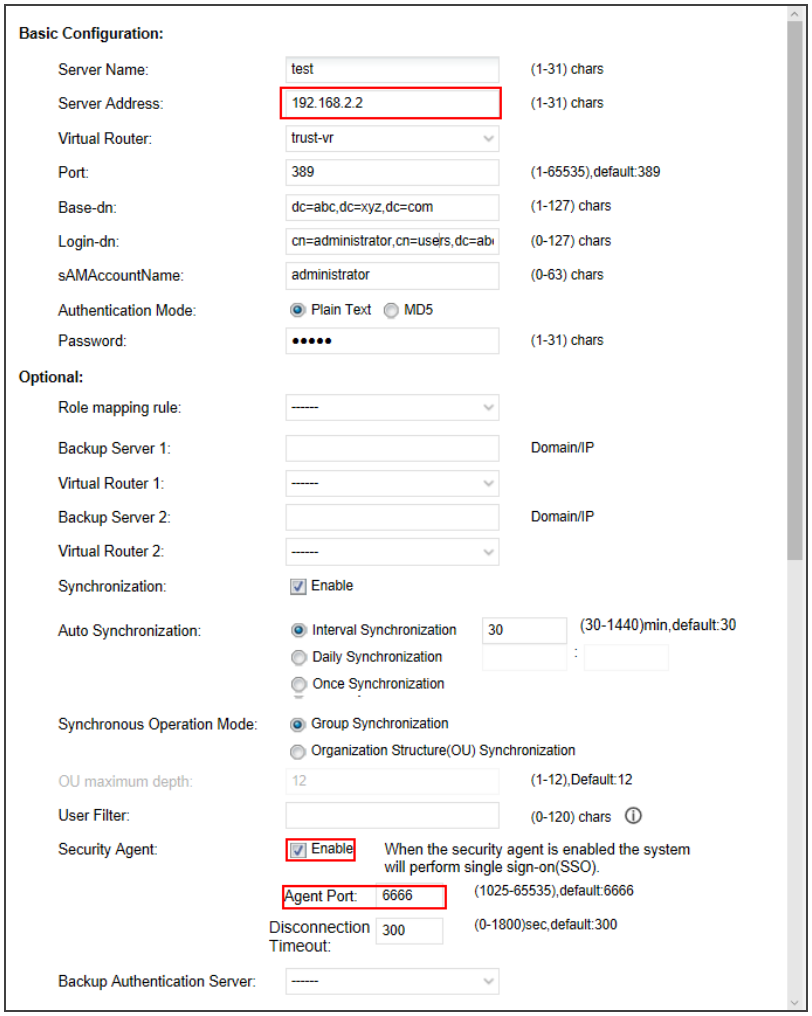
6. Click the <Discovered User> tab to view the corresponding relationship between the user name and user address that has been detected.
7. On the <AD Scripting> tab, click **Get AD Scripting** to get the script "Logonscript.exe". (For introduction and installation of this script, refer to "Using AD Scripting for SSO" on Page 97) .
8. Click **Commit** to submit all settings and start AD Security Agent service in the mean time.

Note: After you have committed, AD Agent service will be running in the background all the time. If you want to modify settings, you can edit in the **AD Agent Configuration Tool** and click **Commit**. The new settings can take effect immediately.

Step 2: Configuring AD server for StoneOS

To ensure that the AD Security Agent can communicate with StoneOS, take the following steps to configure the AD server:

1. Click **Object>AAA Server** to enter the AAA server page.
2. Choose one of the following two methods to enter the Active Directory server configuration page:
   - Click the + New button on the upper left corner of the page, and choose **Active Directory Server** in the drop-down list.
   - Choose the configured AD server and click the Edit button on the upper left corner of the page.



3. For basic configuration of AD server, see Configuraing Active Directory Server.
   The following configurations should be matched with the AD Security Agent:

   - **Server Address**: Specify the IP address or domain name of AD server. It should be the same with the IP address of the device installed AD Security Agent.
   - **Security Agent**: Check the checkbox to enable SSO function, and the server can send the user online information to StoneOS.
     - **Agent Port**: Specify the monitoring port. StoneOS communicates with the AD Security Agent through this port. The range is 1025 to 65535. The default value is 6666. This port should be the same with the configured port of AD Security Agent, or system will fail to communicate with the AD Agent.
     - **Disconnection Timeout**: Specifies the timeout time of deleting user binding information. The range is 0 to 1800 seconds. The default value is 300 seconds. 0 means never timeout.

4. Click **OK** to finish the related configuration of AD server.

After completing the above two steps, when domain user logs in the AD server, the AD Security Agent will send the user name, address and online time to the StoneOS.

802.1x

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

802.1X is a standard defined by IEEE for Port-based Network Access Control. It uses Layer-2 based authentication (protocol: EAPOL, Extensible Authentication Protocol over LAN) to verify the legality of the users accessing the network through LAN. Before authentication, the security device only allows the 802.1X message to pass through the port. After authentication, all of the normal traffic can pass through.

The AAA servers for 802.1x are Local server and Radius server. Other types of AAA servers like AD or LDAP server do not support 802.1x.

The authenticating process is the same with other authentication, please refer to "Chapter 5 Authentication" on Page 88.

Configuring 802.1x

A complete configuration for 802.1x authentication includes the following points:

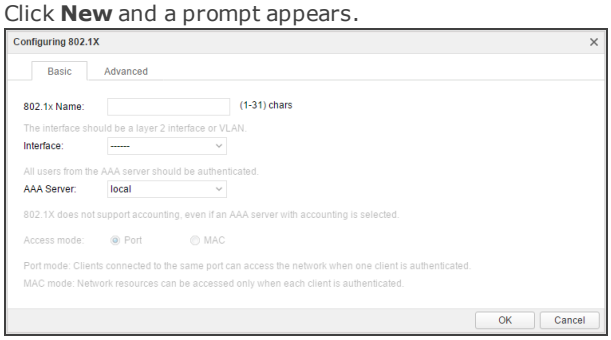
- Prerequisite: Before configuration, you should already have the AAA server you want (only local or Radius server is supported for 802.1x). The AAA server has been added in the firewall system (refer to AAA server), and the interface for authentication has been bound to a security zone (refer to interface).
- Configuration key steps:
  1. Creating a 802.1x profile.
  2. Creating a security policy to allow accessing.
- In the user's PC, modify the network adapter's properties: If the computer is connected to the 802.1x interface, this computer should enable its authentication function on its LAN port (right click **LAN** and select **Properties**, in the prompt, under the <Authentication> tab, select **MD5-Challenge** or **Microsoft: Protected EAP (PEAP)**, and click **OK** to confirm.)

> **Note:** Early versions of Windows have enabled 802.1x by default, but Windows 7 and Window 8 do not have this feature enabled. To enable 802.1x, please search online for a solution that suits your system.

Creating 802.1x Profile

To create a 802.1x profile, take the following steps:

1. Select **Network > 802.1x > 802.1x**.
2. Click **New** and a prompt appears.



Under the Basic tab and Advanced tab, enter values

Basic	
802.1x Name	Enter a name for the 802.1x profile
Interface	Select the interface for 802.1x authentication. It should be a Layer-2 interface interface.
AAA Server	Select the AAA server for 802.1x authentication. It should be a local server or a Radius server.
Access Mode	Select an access mode. If you select **Port** and one of the clients connected to 802.1x interface has passed authentication, all clients can access the Internet. If you select **MAC**, every client must pass authentication before using Internet.
Advanced	
Port authorized	If you select Auto, system will allow users who have successfully passed authentication to connect to network; If you select Force-unauthorized, system will disable the authorization of the port; as a result, no client can connect to the port, so there is no way to connect to the network.
Re-auth period	Enter a time period as the re-authentication time. After a user has successfully connected to the network, system will automatically re-auth the user's credentials. The range is from 0 to 65535 seconds. If the value is set to 0, this function is disabled.
Quiet period	If the authentication fails, it will take a moment before system can process the authenticating request from the same client again. The range is 0 to 65535 seconds, and the default value is 60 seconds. If this value is set to 0, system will not wait, and will immediately process the request from the same client.
Retry times	Specifies a number for retry times. If the authentication system does not receive any response from the client, system will try to require user's credentials again. When system has tried for the specified times, it will stop trying. The range is 1 to 10 times, and the default is 2 times.
Sever timeout	Specifies a server timeout value. The authenticator transmits the client's credentials to the authentication server. If the server does not answer the authenticator within a specified time, the authenticator will resend request to the authentication server. The range is 1 to 65535 seconds, the default value is 30 seconds.
Client timeout	When the authenticator sends a request to ask the client to submit his/her username, the client needs to respond within a specified period. If the client does not respond before timeout, system will resend the authentication request message. The range is 1 to 65535 seconds, and the default value is 30 seconds.

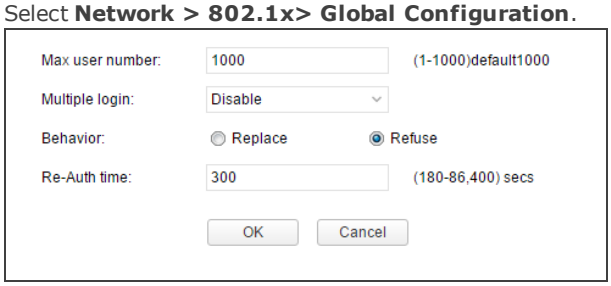
3. Click **OK**.

802.1x Global Configuration

Global parameters apply to all 802.1x profiles.

To configure global parameters, take the following steps:

1. Select **Network > 802.1x> Global Configuration**.



In the Global Configuration dialog box, specify the parameters that will be applicable for all 802.1x profiles.

Option	Description
Max user number	The maximum user client number for a authentication port.
Multiple login	You may choose to allow or disable one account to login from different clients. • **Disable**: If you select Disable, one account can only login from one client simultaneously. Then, when you want to kick off the old login user, you should select **Replace**; if you want to disallow new login user, select **Refuse**. • **Enable**: If you select **Enable**, different clients can use one account to login. If you do not limit the login client number, select **Unlimited**; if you want to set up a maximum login number, select **Max attempts** and enter a value for maximum user client number.
Re-Auth time	Specify a time for authentication timeout value. If the client does not respond within the timeout period, the client will be required to re-enter its credentials. The range is 180 to 86400 seconds, the default value is 300 seconds.

2. Click **OK**.

Viewing Online Users

To view which authenticated users are online:

1. Select **Network > 802.1x > Online user**.
2. The page will show all online users. You can set up filters to view results that match your conditions.

PKI

PKI (Public Key Infrastructure) is a system that provides public key encryption and digital signature service. PKI is designed to automate secret key and certificate management, and assure the confidentiality, integrity and non-repudiation of data transmitted over the Internet. The certificate of PKI is managed by a public key by binding the public key with a respective user identity by a trusted third-party, thus authenticating the user over the Internet. A PKI system consists of Public Key Cryptography, CA (Certificate Authority), RA (Certificate Authority), Digital Certificate and related PKI storage library.

PKI terminology:

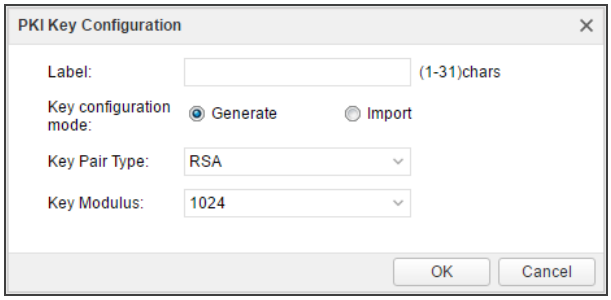
- Public Key Cryptography: A technology used to generate a key pair that consists of a public key and a private key. The public key is widely distributed, while the private key is only known to the recipient. The two keys in the key pair complement each other, and the data encrypted by one key can only be decrypted by the other key of the key pair.
- CA: A trusted entity that issues digital certificates to individuals, computers or any other entities. CA accepts requests for certificates and verifies the information provided by the applicants based on certificate management policy. If the information is legal, CA will sign the certificates with its private key and issue them to the applicants.
- RA: The extension to CA. RA forwards requests for a certificate to CA, and also forwards the digital certificate and CRL issued by CA to directory servers in order to provide directory browsing and query services.
- CRL: Each certificate is designed with expiration. However, CA might revoke a certificate before the date of expiration due to key leakage, business termination or other reasons. Once a certificate is revoked, CA will issue a CRL to announce the certificate is invalid, and list the series number of the invalid certificate.

PKI is used in the following two situations:

- IKE VPN: PKI can be used by IKE VPN tunnel.
- HTTPS/SSH: PKI applies to the situation where a user accesses a Hillstone device over HTTPS or SSH.
- "Sandbox" on Page 360: Support the verification for the trust certification of PE files.

Creating a PKI Key

1. Select **System > PKI > Key**.
2. Click **New**.



In the PKI Key Configuration dialog, configure the following.

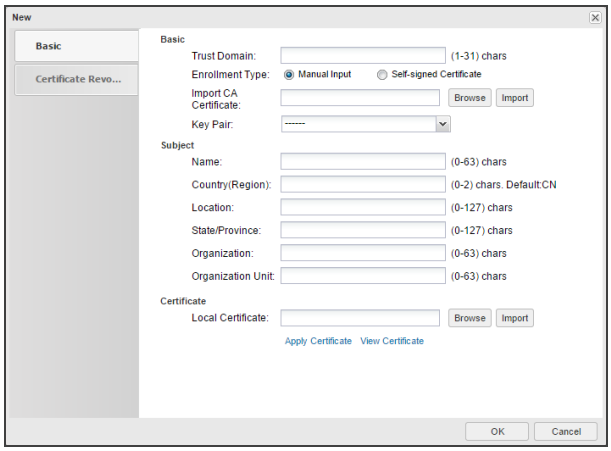
Option	Description
Label	Specifies the name of the PKI key. The name must be unique.
Key configuration mode	Specifies the generation mode of keys, which includes Generate and Import.
Key Pair Type	Specifies the type of key pair, either RSA or DSA.
Key modulus	Specifies the modulus of the key pair. The options are 1024 (the default value), 2048, 512 and 768 bits.

Option	Description
Import Key	Browse your local file system and import the key file.

3. Click **OK**.

Creating a Trust Domain

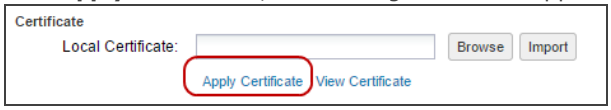
1. Select **System > PKI > Trust Domain**.
2. Click New.



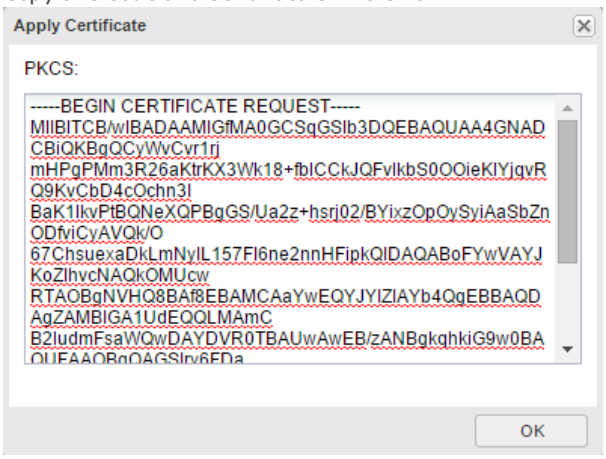
In the Basic tab, configure values for basic properties.

Option	Description
Basic	
Trust Domain	Enter the name of the new trust domain.
Enrollment Type	Use one of the two following methods: • Select **Manual Input**, and click **Browse** to find the certificate and click **Import** to import it into system. • Select **Self-signed Certificate**, and the certificate will be generated by the device itself.
Key Pair	Select a key pair.
Subject	
Name	Enter a name of the subject.
Country (Region)	Enter the name of applicant's country or region. Only an abbreviation of two letters are allowed, like CN.
Location	Optional. The location of the applicant.
State/Province	Optional. State or province name.
Organization	Optional. Organization name.
Organization unit	Optional. Department name within applicant's organization.

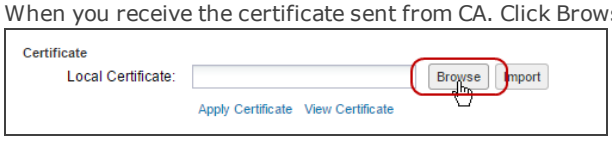
3. Click **Apply Certificate**, and a string of code will appear.



4. Copy this code and send it to CA via email.



5. When you receive the certificate sent from CA. Click Browse to import the certificate.



6. **(Optional) In the CRL tab, configure the following.**

Certification Revocation List	
Check	• No Check - System does not check CRL. This is the default option. • Optional - System accepts certificating from peer, no matter if CRL is available or not. • Force - System only accepts certificating from peer when CRL is available.
URL 1-3	The URL address for receiving CRL. At most 3 URLs are allowed, and their priority is from 1 to 3. • Select **http://** if you want to get CRL via HTTP. • Select **ldap://** if you want to get CRL via LDAP. • If you use LDAP to receive CRL, you need to enter the login-DN of LDAP server and password. If no login-DN or password is added, the transmission will be anonymous.
Auto Update	Update frequency of CRL list.
Manual Update	Get the CRL immediately by clicking **Obtaining CRL**.

7. Click **OK**.

Importing/Exporting Trust Domain

To simplify configurations, you can export certificates (CA or local) and private key (in the format of PKSC12) to a computer and import them to another device.

To export a PKI trust domain, take the following steps:

1. Select **System > PKI > Trust Domain Certificate**.
2. Select a domain from drop-down menu.
3. Select the radio button of the item you want to export, and click **Export**.

If you choose PKCS, you need to set up password.

4. Click **OK**, and select a storage path to save the item.

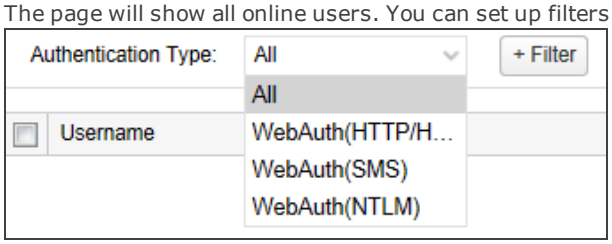
To import the saved trust domain to another device, take the following steps:

1. Log in the other device, select **System > PKI > Trust Domain Certificate**.
2. Select a domain from drop-down menu.
3. Select the radio button of the item you want to import, and click **Import**.
   If you choose PKCS, you need to enter the password when it was exported.
4. Click **Browse** and find the file to import.
5. Click **OK**. The domain file is imported.

Online Users

To view the online authenticated users, take the following steps:

1. Select **Network >WebAuth > Online Users**.
2. The page will show all online users. You can set up filters to views results that match your conditions.



Chapter 6 VPN

System supports the following VPN functions:

- "IPSec VPN" on Page 118: IPSec is a security framework defined by the Internet Engineering Task Force (IETF) for securing IP communications. It is a Layer 3 virtual private network (VPN) technology that transmits data in a secure tunnel established between two endpoints.
- "SSL VPN" on Page 137: SSL provides secure connection services for TCP-based application layer protocols by using data encryption, identity authentication, and integrity authentication mechanisms.
- "L2TP VPN" on Page 196: L2TP is one protocol for VPDN tunneling. VPDN technology uses a tunneling protocol to build secure VPNs for enterprises across public networks. Branch offices and traveling staff can remotely access the headquarters' Intranet resources through a virtual tunnel over public networks.

IPSec VPN

IPSec is a widely used protocol suite for establishing a VPN tunnel. IPSec is not a single protocol, but a suite of protocols for securing IP communications. It includes Authentication Headers (AH), Encapsulating Security Payload (ESP), Internet Key Exchange (IKE) and some authentication methods and encryption algorithms. IPSec protocol defines how to choose the security protocols and algorithms, as well as the method for exchanging security keys among communicating peers, while offering the upper layer protocols with network security services, including access control, data source authentication, data encryption, etc.

Basic Concepts

- Security association
- Encapsulation modes
- Establishing SA
- Using IPSec VPN

Security Association (SA)

IPSec provides encrypted communication between two peers which are known as IPSec ISAKMP gateways. Security Association (SA) is the basis and essence of IPSec. SA defines some factors of communication peers like the protocols, operational modes, encryption algorithms (DES, 3DES, AES-128, AES-192 and AES-256), shared keys of data protection in particular flows and the life cycle of SA, etc.

SA is used to process data flow in one direction. Therefore, in a bi-directional communication between two peers, you need at least two security associations to protect the data flow in both of the directions.

Encapsulation Modes

IPSec supports the following IP packet encapsulation modes:

- Tunnel mode - IPSec protects the entire IP packet, including both the IP header and the payload. It uses the entire IP packet to calculate an AH or ESP header, and then encapsulates the original IP packet and the AH or ESP header with a new IP header. If you use ESP, an ESP trailer will also be encapsulated. Tunnel mode is typically used for protecting gateway-to-gateway communications.
- Transport mode - IPSec only protects the IP payload. It only uses the IP payload to calculate the AH or ESP header, and inserts the calculated header between the original IP header and payload. If you use ESP, an ESP trailer is also encapsulated. The transport mode is typically used for protecting host-to-host or host-to-gateway communications.

Establishing SA

There are two ways to establish SA: manual and IKE auto negotiation (ISAKMP).

- Manually configuring SA is complicated as all the information will be configured by yourself and some advanced features of IPSec are not supported (e.g. timed refreshing), but the advantage is that manually configured SA can independently fulfill IPSec features without relying on IKE. This method applies to a situation with a small number of devices or an environment of static IP addresses.
- IKE auto negotiation method is comparatively simple. You only need to configure information of IKE negotiation and leave the rest jobs of creating and maintaining SA to the IKE auto negotiation function. This method is for medium and large dynamic networks. Establishing SA by IKE auto negotiation consists of two phases. The Phase 1 negotiates and creates a communication channel (ISAKMP SA) and authenticates the channel to provide confidentiality, data integrity and data source authentication services for further IKE communication; the Phase 2 creates IPSec SA using the established ISAKMP. Establishing SA in two phases can speed up key exchanging.

Using IPSec VPN

To apply VPN tunnel feature in the device, you can use policy-based VPN or route-based VPN.

- Policy-based VPN - Applies the configured VPN tunnel to a policy so that the data flow which conforms to the policy settings can pass through the VPN tunnel.
- Route-based VPN - Binds the configured VPN tunnel to the tunnel interface and define the next hop of static route as the tunnel interface.

Configuring an IKE VPN

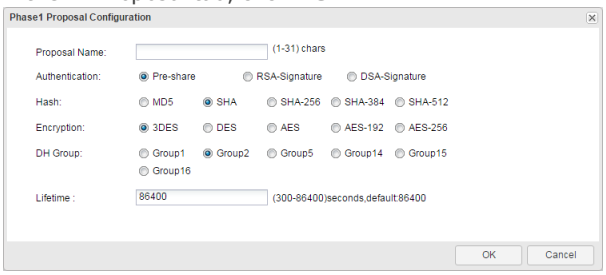
IKE auto negotiation method is comparatively simple. You only need to configure information of IKE negotiation and leave the rest jobs of creating and maintaining SA to the IKE auto negotiation function. This method is for medium and large dynamic network. Establishing SA by IKE auto negotiation consists of two phases. The Phase 1 negotiates and creates a communication channel (ISAKMP SA) and authenticates the channel to provide confidentiality, data integrity and data source authentication services for further IKE communication; the Phase 2 creates IPSec SA using the established ISAKMP. Establishing SA in two phases can speed up key exchanging.

To configure an IKE VPN, you need to confirm the Phase 1 proposal, the Phase 2 proposal, and the VPN peer. After confirming these three contents, you can proceed with the configuration of IKE VPN settings.

Configuring a Phase 1 Proposal

The P1 proposal is used to negotiate the IKE SA. To configure a P1 proposal, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. In the P1 Proposal tab, click **New**.



In the Phase1 Proposal Configuration dialog box, configure the corresponding options.

Option	Description
Proposal Name	Specifies the name of the Phase1 proposal.
Authentication	Specifies the IKE identity authentication method. IKE identity authentication is used to verify the identities of both communication parties. There are three methods for authenticating identity: pre-shared key, RSA signature and DSA signature. The default value is pre-shared key. For pre-shared key method, the key is used to generate a secret key and the keys of both parties must be the same so that it can generate the same secret keys.
Hash	Specifies the authentication algorithm for Phase1. Select the algorithm you want to use. • MD5 – Uses MD5 as the authentication algorithm. Its hash value is 128-bit. • SHA – Uses SHA as the authentication algorithm. Its hash value is 160-bit. This is the default hash algorithm. • SHA-256 – Uses SHA-256 as the authentication algorithm. Its hash value is 256-bit. • SHA-384 – Uses SHA-384 as the authentication algorithm. Its hash value is 384-bit. • SHA-512 – Uses SHA-512 as the authentication algorithm. Its hash value is 512-bit.
Encryption	Specifies the encryption algorithm for Phase1. • 3DES - Uses 3DES as the encryption algorithm. The key length is

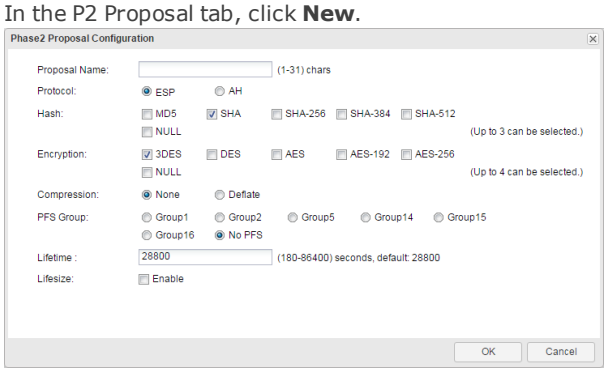
Option	Description
	192-bit. This is the default encryption algorithm. • DES – Uses DES as the encryption algorithm. The key length is 64-bit. • AES – Uses AES as the encryption algorithm. The key length is 128-bit. • AES-192 – Uses 192-bit AES as the encryption algorithm. The key length is 192-bit. • AES-256 – Uses 256-bit AES as the encryption algorithm. The key length is 256-bit.
DH Group	Specifies the DH group for Phase1 proposal. • Group1 – Uses Group1 as the DH group. The key length is 768-bit. • Group2 – Uses Group2 as the DH group. The key length is 1024-bit. Group2 is the default value. • Group5 – Uses Group5 as the DH group. The key length is 1536-bit. • Group14 – Uses Group14 as the DH group. The key length is 2048-bit. • Group15 – Uses Group5 as the DH group. The key length is 3072-bit. • Group16 – Uses Group5 as the DH group. The key length is 4096-bit.
Lifetime	Specifies the lifetime of SA Phase1. The value range is 300 to 86400 seconds. The default value is 86400. Type the lifetime value into the Life-time box. When the SA lifetime runs out, the device will send a SA P1 deleting message to its peer, notifying that the P1 SA has expired and it requires a new SA negotiation.

3. Click **OK** to save the settings.

Configuring a Phase 2 Proposal

The P2 proposal is used to negotiate the IPSec SA. To configure a P2 proposal, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. In the P2 Proposal tab, click **New**.



In the Phase2 Proposal Configuration dialog box, configure the corresponding options.

Option	Description
Proposal Name	Specifies the name of the Phase2 proposal.
Protocol	Specifies the protocol type for Phase2. The options are ESP and AH. The default value is ESP.
Hash	Specifies the authentication algorithm for Phase2. Select the algorithm you want to use. • MD5 – Uses MD5 as the authentication algorithm. Its hash value is 128-bit. • SHA – Uses SHA as the authentication algorithm. Its hash value is 160-bit. This is the default hash algorithm. • SHA-256 – Uses SHA-256 as the authentication algorithm. Its hash value is 256-bit. • SHA-384 – Uses SHA-384 as the authentication algorithm. Its hash value is 384-bit. • SHA-512 – Uses SHA-512 as the authentication algorithm. Its hash value is 512-bit. • Null – No authentication.
Encryption	Specifies the encryption algorithm for Phase2. • 3DES - Uses 3DES as the encryption algorithm. The key length is 192-bit. This is the default encryption algorithm. • DES – Uses DES as the encryption algorithm. The key length is 64-bit. • AES – Uses AES as the encryption algorithm. The key length is 128-bit. • AES-192 – Uses 192-bit AES as the encryption algorithm. The key length is 192-bit. • AES-256 – Uses 256-bit AES as the encryption algorithm. The key length is 256-bit. • Null – No authentication.
Compression	Specifies the compression algorithm for Phase2. By default, no compression algorithm is used.
PFS Group	Specifies the PFS function for Phase2. PFS is used to protect DH algorithm. • No PFS - Disables PFS. This is the default value. • Group1 – Uses Group1 as the DH group. The key length is 768-bit. • Group2 – Uses Group2 as the DH group. The key length is 1024-bit. Group2 is the default value. • Group5 – Uses Group5 as the DH group. The key length is 1536-bit. • Group14 – Uses Group14 as the DH group. The key length is 2048-bit.

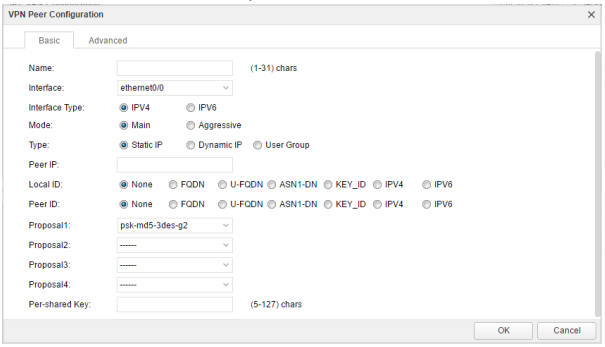
Option	Description
	• Group15 – Uses Group5 as the DH group. The key length is 3072-bit. • Group16 – Uses Group5 as the DH group. The key length is 4096-bit.
Lifetime	You can evaluate the lifetime by two standards which are the time length and the traffic volume. Type the lifetime length of P2 proposal into the box. The value range is 180 to 86400 seconds. The default value is 28800.
Lifesize	Select **Enable** to enable the P2 proposal traffic-based lifetime. By default, this function is disabled. After selecting Enable, specifies the traffic volume of lifetime. The value range is 1800 to 4194303 KBs. The default value is 1800. Type the traffic volume value into the box.

3. Click **OK** to save the settings.

Configuring a VPN Peer

To configure a VPN peer, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. In the VPN Peer List tab, click **New**.



In the VPN Peer Configuration dialog box, configure the corresponding options.

Basic	
Name	Specifies the name of the ISAKMP gateway.
Interface	Specifies interface bound to the ISAKMP gateway.
Interface Type	Select the interface type, including IPv4 or IPv6. Only the IPv6 firmware supports to configure IPv6 type interface.
Mode	Specifies the mode of IKE negotiation. There are two IKE negotiation modes: **Main** and **Aggressive**. The main mode is the default mode. The aggressive mode cannot protect identity. You have no choice but use the aggressive mode in the situation where the IP address of the center device is static and the IP address of client device is dynamic.
Type	Specifies the type of the peer IP. If the peer IP is static, type the IP address into the **Peer IP** box; if the peer IP type is user group, select the AAA server you need from the **AAA Server** drop-down list.
Local ID	Specifies the local ID. System supports five types of ID: FQDN, U-FQDN, Asn1dn (only for license), KEY-ID and IP. Select the ID type you want, and then type the content for this ID into the **Local ID** box or the **Local IP** box.
Peer ID	Specifies the peer ID. System supports five types of ID: FQDN, U-FQDN,

Basic	
	Asn1dn (only for license), KEY-ID and IP. Select the ID type you want, and then type the content for this ID into the **Peer ID** box or the **Peer IP** box.
Proposal1/2/3/4	Specifies a P1 proposal for ISAKMP gateway. Select the suitable P1 proposal from the **Proposal1** drop-down list. You can define up to four P1 proposals for an ISAKMP gateway
Pre-shared Key	If you choose to use pre-shared key to authenticate, type the key into the box.
Trust Domain	If you choose to use RSA signature or DSA signature, select a trust domain.
User Key	Click **Generate**. In the Generate the User Key dialog box, type the IKE ID into the **IKE ID** box, and then click **Generate**. The generated user key will be displayed in the **Generate Result** box. PnPVPN client uses this key as the password to authenticate the login users.

3. If necessary, click the **Advanced** tab to configure some advanced options.

In the Advanced tab, configure the corresponding options.

Advanced	
Connection Type	Specifies the connection type for ISAKMP gateway. • Bidirection - Specifies that the ISAKMP gateway serves as both the initiator and responder. This is the default value. • Initiator - Specifies that the ISAKMP gateway serves as the only initiator. • Responder - Specifies that the ISAKMP gateway serves as the only responder.
NAT Traversal	This option must be enabled when there is a NAT device in the IPSec or IKE tunnel and the device implements NAT. By default, this function is disabled.
Any Peer ID	Makes the ISAKMP gateway accept any peer ID and not check the peer IDs.
Generate Route	Select the **Enable** check box to enable the auto routing function. By default, this function is disabled. This function allows the device to automatically add routing entries which are from the center device to the branch, avoiding the problems caused by manual configured routing.
DPD	Select the **Enable** check box to enable the DPD (Delegated Path Discovery) function. By default, this function is disabled. When the responder does not receive the peer's packets for a long period, it can enable DPD and initiate a DPD request to the peer so that it can test if the ISAKMP gateway exists. • DPD Interval - The interval of sending DPD request to the peer. The value range is 1 to 10 seconds. The default value is 10 seconds. • DPS Retries - The times of sending DPD request to the peer. The device will keep sending discovery requests to the peer until it reaches the specified times of DPD reties. If the device does not receive response from the peer after the retry times, it will determine that the peer ISAKMP gateway is down. The value range is 1 to 10 times. The default value is 3.
Description	Type the description for the ISAKMP gateway.
XAUTH	Select **Enable** to enable the XAUTH server in the device. Then select an

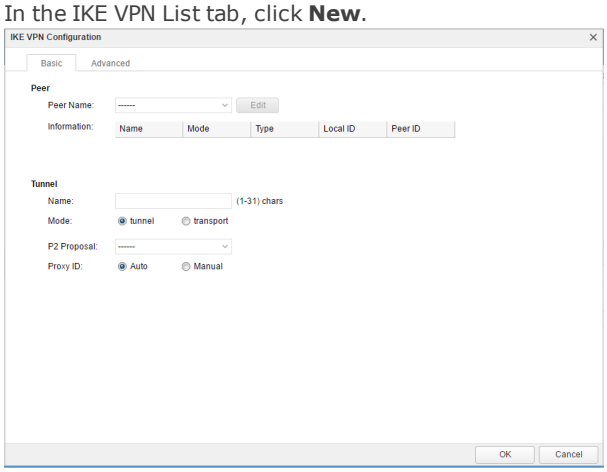
Advanced	
	address pool from the drop-down list. After enabling the XAUTH server, the device can verify the users that try to access the IPSec VPN network by integrating the configured AAA server.

4. Click **OK** to save the settings.

Configuring an IKE VPN

Use IKE to negotiate IPSec SA automatically. To configure IKE VPN, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. In the IKE VPN List tab, click **New**.



In the Basic tab, configure the corresponding options.

Peer	
Peer Name	Specifies the name of the ISAKMP gateway. To edit an ISAKMP gateway, click **Edit**.
Information	Shows the information of the selected peer.
Tunnel	
Name	Type a name for the tunnel.
Mode	Specifies the mode, including tunnel mode and transport mode.
P2 Proposal	Specifies the P2 proposal for tunnel.

Proxy ID	Specifies ID of Phase 2 for the tunnel which can be Auto or Manual.
	• Auto - The Phase 2 ID is automatically designated.
	• Manual - The Phase 2 ID is manually designated. Manual configuration of P2 ID includes the following options:
	  • Local IP/Netmask - Specifies the local ID of Phase 2.
	  • Remote IP/Netmask - Specifies the Phase 2 ID of the peer device.
	  • Service - Specifies the service.

3. If necessary, click the **Advanced** tab to configure some advanced options.

In the Advanced tab, configure the corresponding options.

Advanced	
DNS1/2	Specifies the IP address of the DNS server allocated to the client by the PnPVPN server. You can define one primary DNS server and a backup DNS server.
WINS1/2	Specifies the IP address of WINS server allocated to the client by the PnPVPN server. You can define one primary WINS server and a backup WINS server.
Enable Idle Time	Select the **Enable** check box to enable the idle time function. By default, this function is disabled. This time length is the longest time the tunnel can exist without traffic passing through. When the time is over, SA will be cleared.
DF-Bit	Select the check box to allow the forwarding device to execute IP packet fragmentation. The options are: • Copy - Copies the IP packet DF options from the sender directly. This is the default value. • Clear - Allows the device to execute packet fragmentation. • Set - Disallows the device to execute packet fragmentation.
Anti-Replay	Anti-replay is used to prevent hackers from attacking the device by resending the sniffed packets, i.e., the receiver rejects the obsolete or repeated packets. By default, this function is disabled. • Disabled - Disables this function. • 32 -Specifies the anti-replay window as 32. • 64 - Specifies the anti-replay window as 64. • 128 - Specifies the anti-replay window as 128. • 256 - Specifies the anti-replay window as 256. • 512 - Specifies the anti-replay window as 512.
Commit Bit	Select the **Enable** check box to make the corresponding party configure the commit bit function, which can avoid packet loss and time difference. However, commit bit may slow the responding speed.
Accept-all-proxy-ID	This function is disabled by default. With this function enabled, the device which is working as the initiator will use the peer's ID as its Phase 2 ID in the IKE negotiation, and return the ID to its peer.
Auto Connect	Select the **Enable** check box to enable the auto connection function. By default, this function is disabled. The device has two methods of establishing SA: auto and intrigued traffic mode. When it is auto mode, the device will check SA status every 60 seconds and initiate negotiation request when SA is not established; when it is in intrigued traffic mode, the tunnel will send negotiation request only when there is traffic passing through the tunnel. By default, the intrigued traffic mode is enabled. **Note**: Auto connection works only when the peer IP is static and the local device is the initiator.
Tunnel Route	This item can be modified only after this IKE VPN is created. Click **Choose** to add one or more tunnel routes in the appearing Tunnel Route Configuration dialog box. You can add up to 128 tunnel routes.

Advanced	
Description	Type the description for the tunnel.
VPN Track	Select the **Enable** check box to enable the VPN track function. The device can monitor the connectivity status of the specified VPN tunnel, and also allows backup or load sharing between two or more VPN tunnels. This function is applicable to both route-based and policy-based VPNs. The options are: • Track Interval - Specifies the interval of sending Ping packets. The unit is second. • Threshold - Specifies the threshold for determining the track failure. If system did not receive the specified number of continuous response packets, it will identify a track as failure, i.e., the target tunnel is disconnected. • Src Address - Specifies the source IP address that sends Ping packets. • Dst Address - Specifies the IP address of the tracked object. • Notify Track Event - Select the **Enable** check box to enable the VPN tunnel status notification function. With this function enabled, for route-based VPN, system will inform the routing module about the information of the disconnected VPN tunnel and update the tunnel route once any VPN tunnel disconnection is detected; for policy-based VPN, system will inform the policy module about the information of the disconnected VPN tunnel and update the tunnel policy once any VPN tunnel disconnection is detected.

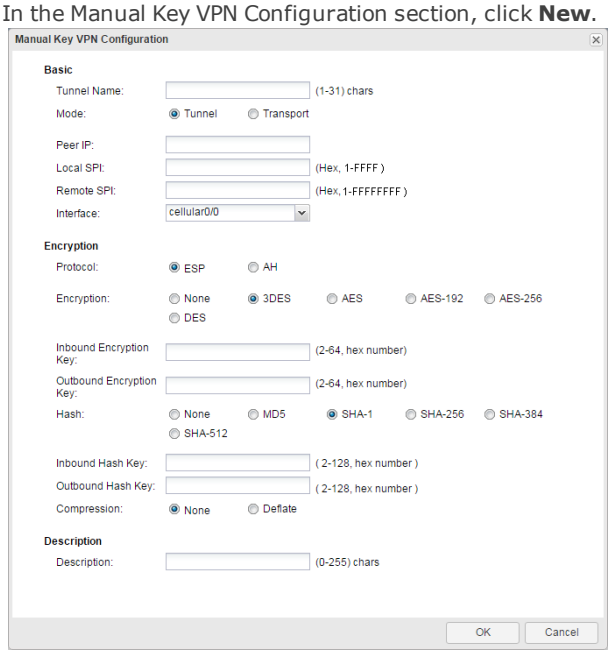
4. Click **OK** to save the settings.

Configuring a Manual Key VPN

Manually configuring SA is complicated as all the information will be configured by yourself and some advanced features of IPSec are not supported (e.g. timed refreshing), but the advantage is that manually configured SA can independently fulfill IPSec features without relying on IKE. This method applies to a situation with a small number of devices or an environment of static IP addresses.

To create a manual key VPN, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. In the Manual Key VPN Configuration section, click **New**.



In the Manual Key VPN Configuration dialog box, configure the corresponding options.

Basic	
Tunnel Name	Specifies the name of manually created key VPN.
Mode	Specifies the mode, including Tunnel and Transport. The tunnel mode is the default mode.
Peer IP	Specifies the IP address of the peer.
Local SPI	Type the local SPI value. SPI is a 32-bit value transmitted in AH and ESP header, which uniquely identifies a security association. SPI is used to seek corresponding VPN tunnel for decryption.
Remote SPI	Type the remote SPI value. **Note**: When configuring an SA, you should configure the parameters of both the inbound and outbound direction. Furthermore, SA parameters of the two ends of the tunnel should be totally matched. The local inbound SPI should be the same with the outbound SPI of the other end; the local outbound SPI should be the same with the inbound SPI of the other end.
Interface	Specifies the egress interface for the manual key VPN. Select the interface you want from the **Interface** drop-down list.
Interface Type	Select the interface type, including IPv4 or IPv6. Only the IPv6 firmware supports to configure IPv6 type interface.

Basic	
Encryption	
Protocol	Specifies the protocol type. The options are ESP and AH. The default value is ESP.
Encryption	Specifies the encryption algorithm. • None – No authentication. • 3DES – Uses 3DES as the encryption algorithm. The key length is 192-bit. This is the default encryption algorithm. • DES – Uses DES as the encryption algorithm. The key length is 64-bit. • AES – Uses AES as the encryption algorithm. The key length is 128-bit. • AES-192 – Uses 192-bit AES as the encryption algorithm. The key length is 192-bit. • AES-256 – Uses 256-bit AES as the encryption algorithm. The key length is 256-bit.
Inbound Encryption Key	Type the encryption key of the inbound direction. You should configure the keys of both ends of the tunnel. The local inbound encryption key should be the same with the peer's outbound encryption key, and the local outbound encryption key should be the same with the peer's inbound encryption key.
Outbound Encryption Key	Type the encryption key of the outbound direction.
Hash	Specifies the authentication algorithm. Select the algorithm you want to use. • None – No authentication. • MD5 – Uses MD5 as the authentication algorithm. Its hash value is 128-bit. • SHA-1 – Uses SHA as the authentication algorithm. Its hash value is 160-bit. This is the default hash algorithm. • SHA-256 – Uses SHA-256 as the authentication algorithm. Its hash value is 256-bit. • SHA-384 – Uses SHA-384 as the authentication algorithm. Its hash value is 384-bit. • SHA-512 – Uses SHA-512 as the authentication algorithm. Its hash value is 512-bit.
Inbound Hash Key	Type the hash key of the inbound direction. You should configure the keys of both ends of the tunnel. The local inbound hash key should be the same with the peer's outbound hash key, and the local outbound hash key should be the same with the peer's inbound hash key.
Outbound Hash Key	Type the hash key of the outbound direction.
Compression	Select a compression algorithm. By default, no compression algorithm is used.

Basic	
Description	
Description	Type the description for the manual key VPN.

3. Click **OK** to save the settings.

Viewing IPSec VPN Monitoring Information

By using the ISAKMP SA table, IPSec SA table, and Dial-up User table, IPSec VPN monitoring function can show the SA negotiation results of IPSec VPN Phase1 and Phase2 as well as information of dial-up users.

To view the VPN monitoring information, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. In the IKE VPN Configuration section, click **IPSec VPN Monitor**.

Options in these tabs are described as follows:

ISAKMP SA

Option	Description
Cookie	Displays the negotiation cookies which are used to match SA Phase 1.
Status	Displays the status of SA Phase1.
Peer	Displays the IP address of the peer.
Port	The port number used by the SA Phase1. 500 indicates that no NAT has been found during the SA Phase 1; 4500 indicates that NAT has been detected.
Algorithm	Displays the algorithm of the SA Phase1, including authentication method, encryption algorithm and verification algorithm.
Lifetime	Displays the lifetime of SA Phase1. The unit is second.

IPSec SA

Option	Description
ID	Displays the tunnel ID number which is auto assigned by the system.
VPN Name	Displays the name of VPN.
Direction	Displays the direction of VPN.
Peer	Displays the IP address of the peer.
Port	The port number used by the SA Phase2.
Algorithm	The algorithm used by the tunnel, including protocol type, encryption algorithm, verification algorithm and depression algorithm.
SPI	Displays the local SPI and the peer SPI. The direction of inbound is local SPI, while outbound is peer SPI.
CPI	Displays the compression parameter index (CPI) used by SA Phase2.
Lifetime (s)	Displays the lifetime of SA Phase2 in seconds, i.e. SA Phase2 will restart negotiations after X seconds.
Lifetime (KB)	Displays the lifetime of SA Phase2 in KB, i.e. SA Phase2 will restart negotiations after X kilobytes of data flow.
Status	Displays the status of SA Phase2.

Dial-up User

Option	Description
Peer	Displays the statistical information of the peer user. Select the peer you want from the Peer drop-down list.
User ID	Displays the IKE ID of the user selected.
IP	Displays the corresponding IP address.
Encrypted Packets	Displays the number of encrypted packets transferred through the tunnel.

Option	Description
Encrypted Bytes	Displays the number of encrypted bytes transferred through the tunnel.
Decrypted Packets	Displays the number of decrypted packets transferred through the tunnel.
Decrypted Bytes	Displays the number of decrypted bytes transferred through the tunnel.

Configuring PnPVPN

IPSec VPN requires sophisticated operational skills and high maintenance cost. To relieve network administrators from the intricate work, system provides an easy-to-use VPN technology - PnPVPN (Plug-and-Play VPN). PnPVPN consists of two parts: PnPVPN Server and PnPVPN Client.

- PnPVPN Server: Normally deployed in the headquarters and maintained by an IT engineer, the PnPVPN Server sends most of the configuration commands to the clients. The device usually works as a PnPVPN Server and one device can serve as multiple servers.
- PnPVPN Client: Normally deployed in the branch offices and controlled remotely by a headquarters engineer, the PnPVPN Client can obtain configuration commands (e.g. DNS, WINS, DHCP address pool, etc.) from the PnPVPN Server with simple configurations, such as client ID, password, and server IP settings.

The device can serve as both a PnPVPN Server and a PnPVPN Client. When working as a PnPVPN Server, the maximum number of VPN instance and the supported client number of each device may vary according to the platform series.

PnPVPN Workflow

The workflow for PnPVPN is as follows:

1. The client initiates a connection request and sends his/her own ID and password to the server.
2. The server verifies the ID and password when it receives the request. If the verification succeeds, the server will send the configuration information, including DHCP address pool, DHCP mask, DHCP gateway, WINS, DNS and tunnel routes, etc,. to the client.
3. The client distributes the received information to corresponding functional modules.
4. The client PC automatically gains an IP address, IP mask, gateway address and other network parameters and connects itself to the VPN.

PnPVPN Link Redundancy

The PnPVPN server supports dual VPN link dials for a PnPVPN client, and automatically generates the routing to the client. Also, it can configure the VPN monitor for the client. Two ISAKMP gateways and two tunnel interfaces need to be configured in the server. The two VPN tunnels need to refer different ISAKMP gateways and be bound to different tunnel interfaces.

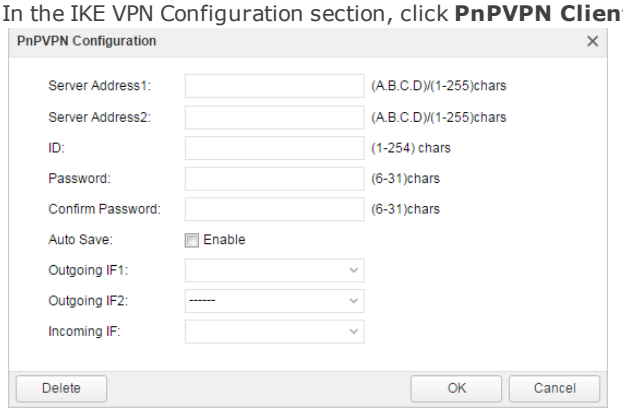
The client supports to configure dual VPN dials and redundant routing. When the two VPN tunnels are negotiating with the server, the client generates routes with different priority according to the tunnel routing configuration at the server side. The high priority tunnel acts as the master link and the tunnel with low priority as the backup link, so as to realize redundant routing. The master VPN tunnel will be in the active state first. When master tunnel is interrupted, the client will use the backup tunnel to transfer the data. When the master tunnel restores to be normal, it will transfer the data again.

Configuring a PnPVPN Client

To configure a PnPVPN client, take the following steps:

1. Select **Network > VPN > IPSec VPN**.

2. In the IKE VPN Configuration section, click **PnPVPN Client**.



In the PnPVPN Configuration dialog box, configure the following options.

Option	Description
Server Address1	Type the IP address of PnPVPN Server into the box. PnPVPN client supports dual link dials to the server side. This option is required.
Server Address2	Type the IP address of PnPVPN Server into the box. The server address 1 and the server address 2 can be the same or different. It is optional.
ID	Specifies the IKE ID assigned to the client by the server.
Password	Specifies the password assigned to the client by the server.
Confirm Password	Enter the password again to confirm.
Auto Save	Select Enable to auto save the DHCP and WINS information released by the PnPVPN Server.
Outgoing IF1	Specifies the interface connecting to the Internet. This option is required.
Outgoing IF2	Specifies the interface connecting to the Internet. The IF1 and the IF2 can be the same or different. It is optional.
Incoming IF	Specifies the interface on the PnPVPN Client accessed by the Intranet PC or the application servers.

3. Click **OK** to save the settings.

Note:

- Server Addresses1 and Outgoing IF1 both need to be configured. If you want to configure a backup link, you need to configure both the Server Address2 and Outgoing IF2.
- If the server addresses or the Outgoing IFs are different, two separate VPN links will be generated.
- The configuration of the two servers can be configured on one device, and can also be configured on two different devices. If you configure it on two devices, you need to configure AAA user on the two devices. The DHCP configuration for the AAA user should be the same, otherwise it might cause that the client and server negotiate successfully, but the traffic is blocked.

Configuring IPSec-XAUTH Address Pool

XAUTH server assigns the IP addresses in the address pool to users. After the client has established a connection to the XAUTH server successfully, the XAUTH server will choose an IP address along with other related parameters (such as DNS server address, WINS server address, etc) from the address pool, and will assign them to the client.

XAUTH server provides fixed IP addresses by creating and implementing IP binding rules that consist of a static IP binding rule and an IP-role binding rule. The static IP binding rule binds the client user to a fixed IP address in the address pool. Once the client has established a connection successfully, system will assign the binding IP to the client. The IP-role binding rule binds the role to a specific IP range in the address pool. Once the client has established a connection successfully, system will assign an IP address within the IP range to the client.

When the XAUTH server is allocating IP addresses in the address pool, system will check the IP binding rule and determine how to assign IP addresses to the client based on the specific checking order below:

1. Check if the client is configured with any static IP binding rule. If so, assign the binding IP address to the client; otherwise, check the other configuration. Note if the binding IP address is in use, the user will be unable to log in.
2. Check if the client is configured with any IP-role binding rule. If so, assign an IP address within the binding IP range to the client; otherwise, the user will be unable to log in.

Note: The IP addresses defined in the static IP binding rule and IP-role binding rule should not be overlapped.

To configure the IPSec-XAUTH address pool, take the following steps:

1. Select **Network > VPN > IPSec VPN**.
2. At the top-right corner, Select **IPSec-XAUTH Address Pool.**.
3. In the XAUTH Address Pool Configuration dialog box, click **New**.

In the Basic tab, configure the corresponding options.

Option	Description
Address Pool Name	Specifies the name of the address pool.
Start IP	Specifies the start IP of the address pool.
End IP	Specifies the end IP of the address pool.
Reserved Start IP	Specifies the reserved start IP of the address pool.
Reserved End IP	Specifies the reserved end IP of the address pool.
Netmask	Specifies the netmask of the IP address.
DNS1/2	Specifies the DNS server IP address for the address pool. It is optional. At most two DNS servers can be configured for one address pool.
WINS1/2	Specifies the WIN server IP addresses for the address pool. It is optional. Up to two WIN servers can be configured for one address pool.

In the IP User Binding tab, configure the corresponding options.

Option	Description
User	Type the user name into the **User** box.
IP	Type the IP address into the **IP** box.
Add	Click **Add** to add the item that binds the specified user to the IP address.

In the IP Role Binding tab, configure the corresponding options.

Option	Description
Role	Select a role from the **Role**drop-down list.
Start IP	Type the start IP address into the **Start IP** box.
End IP	Type the end IP address into the **End IP** box.
Add	Click **Add** to add the item that binds the specified role to the IP address range.
Up/Down/Top/Bottom	Move the selected IP-role binding rule . For the user that is bound to multiple roles that are also configured with their corresponding IP-role binding rules, system will query the IP-role binding rules in order, and assign an IP address based on the first matched rule.

4. Click **OK** to save the settings.

SSL VPN

The device provides an SSL based remote access solution. Remote users can access the intranet resource safely through the provided SSL VPN.

SSL VPN consists of two parts: SSL VPN server and SSL VPN client. The device configured as the SSL VPN server provides the following functions:

- Accept client connections.
- Allocate IP addresses, DNS server addresses, and WIN server addresses to SSL VPN clients.
- Authenticate and authorize clients.
- Perform host checking to client.
- Encrypt and forward IPSec data.

By default, the concurrent online client number may vary on different platform series. You can expand the supported number by purchasing the corresponding license.

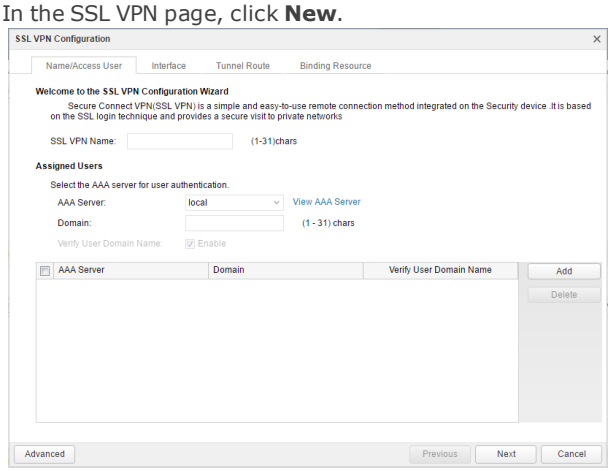
After successfully connecting to the SSL VPN server, the SSL VPN client secures your communication with the server. The following SSL VPN clients are available:

- "SSL VPN Client for Windows" on Page 156
- "SSL VPN Client for Android" on Page 177
- "SSL VPN Client for iOS" on Page 181
- "SSL VPN Client for Mac OS" on Page 186
- "SSL VPN Client for Linux" on Page 189

Configuring an SSL VPN

To configure an SSL VPN, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. In the SSL VPN page, click **New**.



In the Name/Access User tab, configure the corresponding options.

Option	Description
SSL VPN Name	Type the name of the SSL VPN instance

Option	Description
Assigned Users	
AAA Server	Select an AAA server from the **AAA Server** drop-down list. You can click **View AAA Server** to view the detailed information of this AAA server.
Domain	Type the domain name into the **Domain** box. The domain name is used to distinguish the AAA server.
Verify User Domain Name	After enabling this function, system will verify the username and its domain name.
Add	Click **Add** to add the assigned users. You can repeat to add more items.

In the Interface tab, configure the corresponding options.

Access Interface	
Egress Interface1	Select the interface from the drop-down list as the SSL VPN server interface. This interface is used to listen to the request from the SSL VPN client.
Egress Interface2	Select the interface from the drop-down list. This interface is needed when the optimal path detection function is enabled.
Service Port	Specifies the SSL VPN service port number.
Tunnel Interface	
Tunnel Interface	Specifies the tunnel interface used to bind to the SSL VPN tunnel. Tunnel interface transmits traffic to/from SSL VPN tunnel. • Select a tunnel interface from the drop-down list, and then click **Edit** to edit the selected tunnel interface. • Click **New** in the drop-down list to create a new interface.
Information	Shows the zone, IP address, and netmask of the selected tunnel interface.
Address Pool	
Address Pool	Specifies the SSL VPN address pool. • Select an address pool from the drop-down list, and then click **Edit** to edit the selected address pool. • Click **New** in the drop-down list to create a new address pool.
Information	Shows the start IP address, end IP address, and mask of the address pool.

In the Tunnel Route tab, configure the following options.

Tunnel Route	
Specify the destination network segment that you want to access through SCVPN tunnel. The specified destination network segment will be distributed to the VPN client, then the client uses it to generate the route to the specified destination.	
IP	Type the destination IP address.
Mask	Type the netmask of the destination IP address.
Metric	Type the metric value.
Add	Click **Add** to add this route. You can repeat to add more items.
Delete	Click **Delete** to delete the selected route.
Enable domain name	
Specify the destination domain name that you want to access through SCVPN tunnel.	

After selecting the **Enable domain name** check box, system will distribute the specified domain names to the VPN client, and the client will generate the route to the specified destination according to the resolving results from the DNS.	
Domain	Specify the URL of the domain name. The URL cannot exceed 63 characters and it cannot end with a dot (.). Both wildcards and a single top level domain, e.g. **com** and **.com** are not supported.
Add	Click **Add** to add the domain name to the list and you can add up to 64 domain names.
Delete	Click **Delete** to delete the selected domain name.
Domain route max entries	The maximum numbers of routes that can be generated after obtaining the resolved IP addresses of the domain name. The value ranges from 1 to 10000.

In the Binding Resource tab, configure the binding relationship between user groups and resources.

Binding Resource	
Resource List	Types or selects an existing resource name.
User	Specifies a user group name. 1. From the **User** drop-down menu, select the AAA servers where user groups reside. Currently, only the local authentication server and the RADIUS server are available. 2. Based on different types of AAA server, you can execute one or more actions: search a user group, expand the user group list, and enter the name of the user group. 3. After selecting user groups, click → to add them to the right pane. 4. After adding the desired objects, click the blank area in this dialog to complete the configuration. **Note**: • A user group can be bound with multiple resources, and a resource can also be bound with multiple user groups. • Only 32 binding entries can be configured in an SSL VPN instance.
Add	Click **Add** to add binding entries for resources and user groups to the list below. You can repeat to add more items.
Delete	Click **Delete** to delete the selected item.

3. If necessary, click **Advanced** to configure the advanced functions, including parameters, client, host security, SMS authentication, and optimized path.

In the Parameters tab, configure the corresponding options.

Security Kit	
SSL Version	Specifies the SSL protocol version. **Any** indicates one of SSLv2, SSLv3, TLSv1, TLSv1.1, TLSv1.2 or GMSSLv1.0 protocol will be used. If tlsv1.2 or any is specified to the SSL protocol in SSL VPN server, you need to convert the certificate that you are going to import to the browser or certificate in the USB Key to make it support the tlsv1.2 protocol before the digital certificate authentication via SSL VPN client, so that the SSL VPN server can be connected successfully when the Username/Password + Digital Certificate or Digital Certificate Only authentication method is selected. Prepare a PC with Windows or Linux system

	which has been installed with OpenSSL 1.0.1 or later before processing the certificate. We will take the certificate file named oldcert.pfx as an example, the procedure is as follows: 1. In the OpenSSL software interface, enter the following command to convert a certificate in .pfx format to a certificate in .pem format. **openssl pkcs12 –in oldcert.pfx –out cert.pem** 2. Enter the following command to convert the certificate in .pem format to a .pfx format certificate that supports tlsv1.2 protocol. **openssl pkcs12 –export –in cert.pem –out newcert.pfx –CSP "Microsoft Enhanced RSA and AES Cryptographic Provider"** 3. Import the newly generated .pfx format certificate into your browser or USB Key. After the above operation, you have to log into SSL VPN server with SSL VPN client whose version is 1.4.6.1239 or later.
Trust Domain	Specifies the trust domain. When the GMSSLv1.0 protocol is used, the specified PKI trust domain needs to include the SM2 signature certificate and its private key for the GMSSL negotiation.
Encryption Trust Domain	When using the GMSSLv1.0 protocol, you must config this option. The specified encryption PKI trust domain needs to include the SM2 encryption certificate and its private key for the GMSSL negotiation.
Encryption	Specifies the encryption algorithm of the SSL VPN tunnel. The default value is 3DES. **NULL** indicates no encryption. When using the GMSSLv1.0 protocol, you're recommended to select SM4 for the encryption algorithm.
Hash	Specifies the hash algorithm of the SSL VPN tunnel. The default value is SHA-1. **NULL** indicates no hash. When using the GMSSLv1.0 protocol, you're recommended to select SM3 for the hash algorithm.
Compression	Specifies the compression algorithm of the SSL VPN tunnel. By default, no compression algorithm is used.
Client Connection	
Idle Time	Specifies the time that a client stays online without any traffic with the server. After waiting for the idle time, the server will disconnect from the client. The value range is 15 to 1500 minutes. The default value is 30.
Multiple Login	This function permits one client to sign in more than one place simultaneously. Select the **Enable** check box to enable the function.
Multiple Login Times	Type the login time into the **Multiple Login Times** box. The value range is 0 to 99,999,999. The value of 0 indicates no login time limitation.
Advanced Parameters	
Anti-Replay	The anti-replay function is used to prevent replay attacks. The default value is 32.
DF-Bit	Specifies whether to permit packet fragmentation on the device forwarding the packets. The actions include: • Set - Permits packet fragmentation. • Copy - Copies the DF value from the destination of the packet. It is the default value. • Clear - Forbids packet fragmentation.

Port (UDP)	Specifies the UDP port number for the SSL VPN connection.

In the Client tab, configure the corresponding options.

Client Configuration	
Redirect URL	This function redirects the client to the specified redirected URL after a successful authentication. Type the redirected URL into the box. The value range is 1 to 255 characters. HTTP (http://) and HTTPS (https://) URLs are supported. Based on the type of the URL, the corresponding fixed format of URL is required. Take the HTTP type as the example: • For the UTF-8 encoding page - The format is URL+username=$USER&password=$PWD, e.g., http://www.-abc.com/oa/login.do?username=$USER&password=$PWD • For the GB2312 page - The format is URL+username=$GBUSER&password=$PWD, e.g., http://www.-abc.com/oa/login.do?username=$GBUSER&password=$PWD • Other pages: - Type the URL directly, e.g., http://www.abc.com
Title	Specifies the description for the redirect URL. The value range is 1 to 31 bytes. This title will appear as a client menu item.
Delete privacy data after disconnection	Select **Enable** to delete the corresponding privacy data after the client's disconnection.
Digital Certificate Authentication	
Authentication	Select the **Enable** check box to enable this function. There are two options available: • Username/Password + Digital Certificate - To pass the authentication, you need to have the correct file certificate, or the USB Key that stores the correct digital certificate, and also type the correct username and password. The USB Key certificate users also need to type the USB Key password. • Digital Certificate only - To pass the authentication, you need to have the correct file certificate, or the USB Key that stores the correct digital certificate. The USB Key certificater users also need to type the USB Key password. No username or user's password is required. When **Digital Certificate only** is selected: • System can map corresponding roles for the authenticated users based on the CN or OU field of the USB Key certificate. For more information about the role mapping based on CN or OU, see "Role" on Page 232. • System does not allow the local user to change the password. • System does not support SMS authentication. • The client will not re-connect automatically if the USB Key is removed.
Download URL	When USB Key authentication is enabled, you can download the UKey driver from this URL.
Trust Domain Sub-	To configure the trust domain and the subject & username checking function:

ject&Username Checking CN Matching OU Matching	1. From the Trust domain drop-down list, select the PKI trust domain that contains the CA (Certification Authority) certificate. If the client's certificate is the only one that matches to any CA certificate of the trust domain, then the authentication will succeed. 2. If necessary, select the **Subject&Username Checking** check box to enable the subject & username check function. After enabling it, when the user is authenticated by the USB Key certificate, system will check whether the subject CommonName in the client certificate is the same as the name of the login user. You can also enter the strings in the **CN Match** box and the **OU** box to determine whether matches them. 3. Click **Add**. The configured settings will be displayed in the list below. To delete an item, select the item you want to delete from the list, and then click **Delete**.

In the SMS Authentication tab, configure the corresponding options.

SMS Authentication	
SMS Authentication	Select the **Enable** check box to enable the function. And select the **SMS Modem** or **SMS Gateway** radio button to specify the SMS authentication mode.
SMS Gateway Name	Select the SMS gateway name from drop-down list.
Lifetime of SMS Auth Code	Specify the lifetime of the SMS authentication code. Type the lifetime value into the **Lifetime of SMS Auth Code** box. The range is 1 to 10 minites.
Sender Name	Specify a message sender name to display in the message content. The range is 1 to 63.  **Note:** Due to the limitation of UMS enterprise information platform, when the the SMS gateway authentication is enabled, the sender name will be displayed on the name of the UMS enterprise information platform.

In the Host Checking/Binding tab, configure the corresponding options.

Host Checking	
Creates a host checking rule to perform the host checking function. Before creating a host checking rule, you must first configure the host checking profile in "Configuring a Host Checking Profile" on Page 153.	
Role	Specifies the role to which the host checking rule will be applied. Select the role from the **Role** drop-down list. **Default** indicates the rule will take effect to all the roles.
Host Checking Name	Specifies the host checking profile. Select the profile from the **Host Checking Name** drop-down list.
Guest Role	Select the guest role from the **Guest Role** drop-down list. The user will get the access permission of the guest role when the host checking fails.

	If **Null** is selected, system will disconnect the connection when the host checking fails.
Periodic Checking	Specify the checking period. System will check the status of the host automatically according to the host checking profile in each period.
Add	Click **Add**. The configured settings will be displayed in the table below.
Delete	To delete an item, select the item you want to delete from the list, and then click **Delete**.
Host Binding	
Enable Host Binding	Select the **Enable Host Binding** check box to enable the function. By default, one user can only log in one host. You can change the login status by configuring the following options. • Allow one user to login through multiple hosts. • Allow multiple users to login on one host. • Automatically add the user-host ID entry into the binding list at the first login. **Note**: To use the host binding function, you still have to configure it in the host binding configuration page. For more information about host binding, see "Host Binding" on Page 149.

In the Optimized Path tab, configure the corresponding options.

Option	Description
Optimal path detection can automatically detect which ISP service is better, giving remote users a better user experience.	
No Check	Do not detect.
Client	The client selects the optimal path automatically by sending UDP probe packets.
The device	When the client connects to the server directly without any NAT device, this is the detection process: 1. The server recognizes the ISP type of the client according to the client's source address. 2. The server sends all of the sorted IP addresses of the egress interfaces to the client. 3. The client selects the optimal path. When the client connects to the server through a NAT device, this is the detection process: 1. The server recognizes the ISP type of the client according to the client's source address. 2. The server sends all of the sorted NAT IP addresses of the external interfaces to the client. 3. The client selects the optimal path.
NAT Mapping Address and Port	If necessary, in the NAT mapping address and port section, specify the mapped public IPs and ports of the server referenced in the DNAT rules of the DNT device. When the client connects to the server through the

	DNAT device, the NAT device will translate the destination address of the client to the server's egress interface address. Type the IP address of the NAT device's external interface and the HTTPS port number (You are not recommended to specify the HTTPS port as 443, because 443 is the default HTTPS port of WebUI management). You can configure up to 4 IPs.

4. Click **Done** to save the settings.

To view the SSL VPN online users, take the following steps:

1. Select **Configure > Network > SSL VPN**.
2. Select an SSL VPN instance.
3. View the detailed information of the online users in the table.

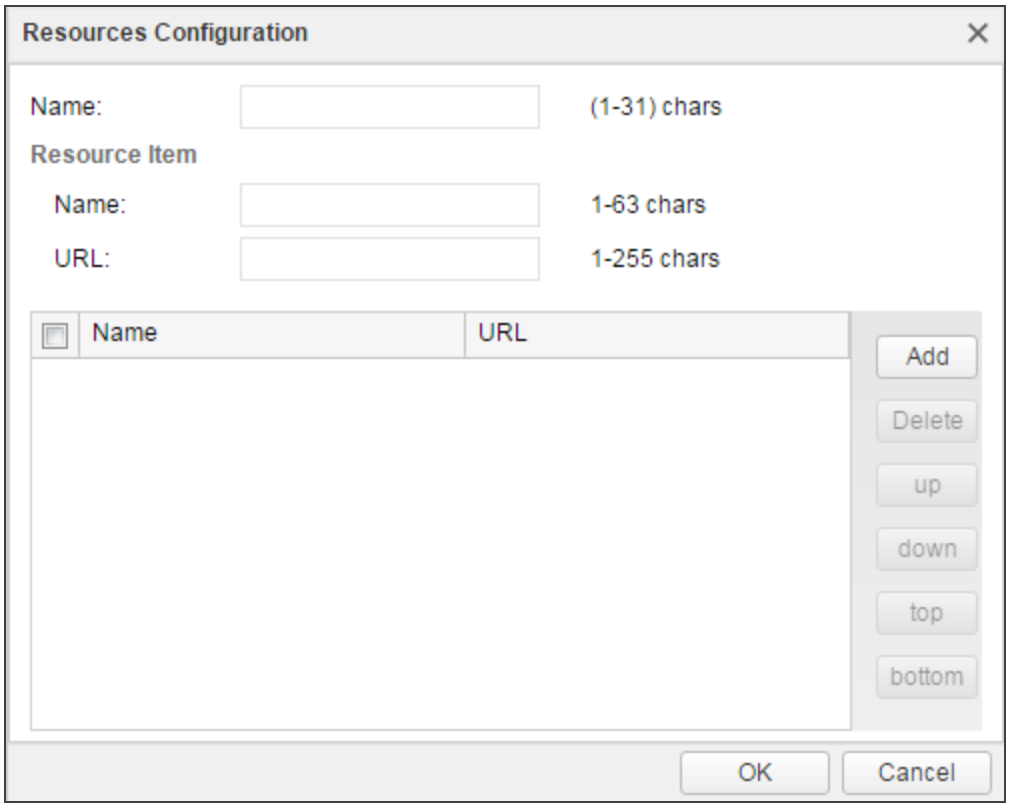
Configuring Resource List

Resource list refers to resources configured in system that can be easily accessible by users. Each resource contains multiple resource items. The resource item is presented in the form of a resource item name followed by a URL in your default browser page. After the SSL VPN user is authenticated successfully, the authentication server will send the user group information of the user to the SSL VPN server. Then, according to the binding relationship between the user group and resources in the SSL VPN instance, the server will send a resource list in which the user can access to the client. After that, the client will analyze and make the IE browser in system pop up a page to display the received resource list information, so that the user can access the private network resource directly by clicking the URL link. The resource list page pops up only after the authentication is passed. If a user does not belong to any user group, the browser will not pop up the resource list page unless authentication is passed.

To configure resource list for SSL VPN:

1. Select **Network > VPN > SSL VPN**.
2. Click **Resources List** at the top-right corner.

3. Click **New**.



In the Resources Configuration dialog box, configure the corresponding options.

Option	Description
Name	Enters a name for the new resource.
Resource Item	
Name	Enters a name for a new resource item. Names of resource items in different resources can not be the same.
URL	Enters a URL for a new resource item.
Add	Click **Add**to add this binding item to the list below. **Note**: The number of resource items that can be added in a resource ranges from 0 to 48. The total number of resource items that can be added in all resources can not exceed 48.
Delete	To delete a rule, select the rule you want to delete from the list and click **Delete**.
Up/Down/Top/Bottom	You can move the location for items at your own choice to adjust the presentation sequence accordingly.

4. Click **OK**, the new resource will be displayed in the resource list.
At most 3 resource items can be displayed in the resource list for each resource, and the other items will be displayed as "...". You can click **Edit** or **Delete** button to edit or delete the selected resource.

Note:

- Less than 48 resources can be configured in a SSL VPN instance.
- The resource list function is only available for Windows SSL VPN clients.

Configuring an SSL VPN Address Pool

The SSL VPN servers allocate the IPs in the SSL VPN address pools to the clients. After the client connects to the server successfully, the server will fetch an IP address along with other related parameters (e.g., DNS server address, and WIN server address) from the SSL VPN address pool and then allocate the IP and parameters to the client.

You can create an IP binding rule to meet the fixed IP requirement. The IP binding rule includes the IP-user binding rule and the IP-role binding rule. The IP-user binding rule binds the client to a fixed IP in the configured address pool. When the client connects to the server successfully, the server will allocate the binding IP to the client. The IP-role binding rule binds the role to an IP range in the configured address pool. When the client connects to the server successfully, the server will select an IP from the IP range and allocate the IP to the client.

After the client successfully connects to the server, the server will check the binding rules in a certain order to determine which IP to allocate. The order is shown as below:

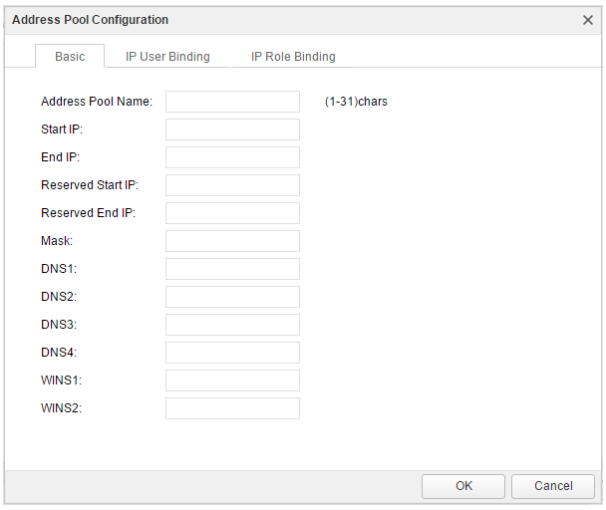
- Check whether the IP-user binding rule is configured for the client. If yes, allocate the bound IP to the client; if no, the server will select an IP which is not bound or used from the address pool, then allocate it to the client.
- Check whether the IP-role binding rule is configured for the client. If yes, get an IP from the IP range and allocate to the client; if no, the server will select an IP which is not bound or used from the address pool, then allocate it to the client.

Note: IP addresses in the IP-user binding rule and the IP address in the IP-role binding rules should not overlap.

To configure an address pool, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. Click **Address Pool** at the top-right corner.

3. Click **New**.



In the Basic tab, configure the following options.

Option	Description
Address Pool Name	Specifies the name of the address pool.
Start IP	Specifies the start IP of the address pool.
End IP	Specifies the end IP of the address pool.
Reserved Start IP	Specifies the reserved start IP of the address pool.
Reserved End IP	Specifies the reserved end IP of the address pool.
Mask	Specifies the netmask in the dotted decimal format.
DNS1/2/3/4	Specifies the DNS server IP address for the address pool. It is optional. 4 DNS servers can be configured for one address pool at most.
WINS1/2	Specifies the WIN server IP addresses for the address pool. It is optional. Up to 2 WIN servers can be configured for one address pool.

In the IP User Binding tab, configure the corresponding options.

Option	Description
User	Type the user name into the **User** box.
IP	Type the IP address into the **IP** box.
Add	Click **Add** to add this IP user binding rule.
Delete	To delete a rule, select the rule you want to delete from the list and click **Delete**.

In the IP Role Binding tab, configure the corresponding options.

Option	Description
Role	Type the role name into the **Role** box.
Start IP	Type the start IP address into the **Start IP** box.
End IP	Type the end IP address into the **End IP** box.
Add	Click **Add**to add this IP role binding rule.
Delete	To delete a rule, select the rule you want to delete from the list and click **Delete**.

Up/Down/Top/Bottom	System will query IP role binding rules by turn, and allocate the IP address according to the first matched rule. You can move the location up or down at your own choice to adjust the matching sequence accordingly.

4. Click **OK** to save the settings.

Configuring SSL VPN Login Page

You can customize the title and background of the SSL VPN login page. The default title is **Login** and the login page is shown as below:

To customize the SSL VPN login page, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top-right corner, click **Login Page Configuration**.
3. Click **Browse** to select the background picture. The selected pictures must be zipped, and the file name must be **Login_box_bg_en.gif** for English pages. The picture size must be 624px*376px.
4. Click **Upload** to upload the background picture to system. After uploading successfully, you will have completed the background picture modification.
5. Enter the title in the **Authentication Page Title** box to customize the title of the login page.
6. Click **OK** to save the settings. Clicking **Cancel** will only affect the authentication page title modification.

If you want to use the default authentication title **Login**, click **Clear Page Title**. Then click **OK**. If you want to restore the default picture, click **Restore Default Background** and select **English** in the pop-up dialog. Then click **OK**.

Host Binding

The host binding function verifies that the hosts are running the SSL VPN clients according to their host IDs and user information. The verification process is:

1. When an SSL VPN user logs in via the SSL VPN client, the client will collect the host information of main board serial number, hard disk serial number, CUP ID, and BIOS serial number.
2. Based on the above information, the client performs the MD5 calculation to generate a 32-digit character, which is named host ID.
3. The client sends the host ID and user/password to the SSL VPN server.
4. The SSL VPN server verifies the host according to the entries in the host unbinding list and host binding list, and deals with the verified host according to the host binding configuration.

The host unbinding list and host binding list are described as follows:

- Host unbinding list: The host unbinding list contains the user-host ID entries for the first-login users.
- Host binding list: The host binding list contains the user-host ID entries for the users who can pass the verification. The entries in the host unbinding list can be moved to the host binding list manually or automatically for the first login. When a user logs in, the SSL VPN server will check whether the host binding list contains the user-host ID entry of the login user. If there is a matched entry in the host binding list, the user will pass the verification and the sever will go on checking the user/password. If there is no matched entry for the login user, the connection will be disconnected.

Configuring Host Binding

Configuring host binding includes host binding/unbinding configurations, super user configurations, shared host configurations, and user-host binding list importing/exporting.

Configuring Host Binding and Unbinding

To add a binding entry to the host binding list, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.
2. Click **Host Binding**.
3. With the Binding and Unbinding tab active, select the entries you want to add to the Host Unbinding List.
4. Click **Add** to add the selected entries to the Host Binding List.

To delete a binding entry from the host binding list, take the following steps:

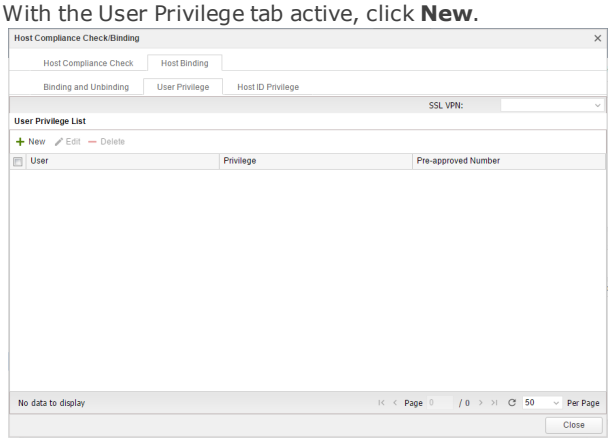
1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.
3. Click **Host Binding**.
4. With the Binding and Unbinding tab active, select the entries you want to delete from the Host binding List.
5. Click **Unbinding** to remove the selected entries from this list.

Configuring a Super User

The super user won't be controlled by the host checking function, and can log into any host. To configure a super user, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.

3. Click **Host Binding**.
4. With the User Privilege tab active, click **New**.



In the New dialog box, configure the corresponding options.

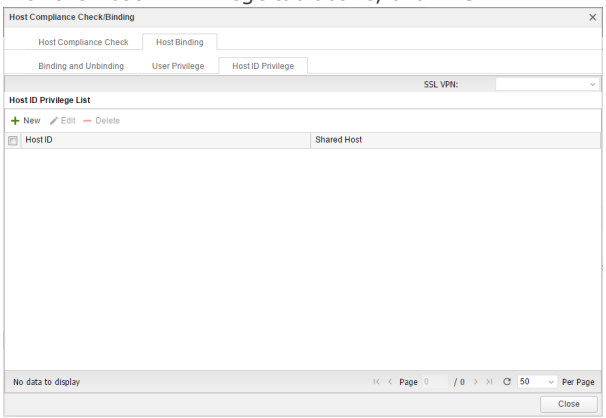
Option	Description
User	Specifies the name of the user.
Super User	Select the **Enable** check box to make it a super user.
Pre-approved Number	If system allows one user to login from multiple hosts, and the option of automatically adding the user-host ID entry into the host binding list at the first login is enabled, then by default system only records the user and first login host ID entry to the host binding list. For example, if the user logs in from other hosts, the user and host ID will be added to the host unbinding list. This pre-approved number specifies the maximum number of user-host ID entries for one user in the host binding list.

5. Click **OK** to save the settings.

Configuring a Shared Host

Clients that log in from the shared host won't be controlled by the host binding list. To configure a shared host, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.
3. Click **Host Binding**.
4. With the Host ID Privilege tab active, click **New**.



In the New dialog box, configure the corresponding options.

Option	Description
Host ID	Type the host ID into the Host ID box.
Shared Host	Select the **Enable** check to make it a shared host. By default, this check box is selected.

5. Click **OK** to save the settings.

Importing/Exporting Host Binding List

To import the host binding list, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.
3. Click **Host Binding**.
4. With the Binding and Unbinding tab active, click **Import**.
5. Click **Browse** to find the binding list file and click **Upload**.

To export the host binding list, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.
3. Click **Host Binding**.
4. With the Binding and Unbinding tab active, click **Export**.
5. Select a path to save the host binding list.

Host Checking

The host checking function checks the security status of the hosts running SSL VPN clients, and according to the check result, the SSL VPN server will determine the security level for each host and assign corresponding resource access right based on their security level. It a way to assure the security of SSL VPN connection. The checked factors include the operating system, IE version, and the installation of some specific software.

The factors to be checked by the SSL VPN server are displayed in the list below:

Factor	Description
Operating system	• Operating system, e.g., Windows 2000, Windows 2003, Windows XP, Windows Vista, Windows 7m Windows 8, etc. • Service pack version, e.g., Service Pack 1 • Windows patch, e.g., KB958215, etc.
	• Whether the Windows Security Center and Automatic Updates are enabled. • Whether the installation of AV software is compulsory, and whether the real-time monitor and the auto update of the signature database are enabled. • Whether the installation of anti-spyware is compulsory, and whether the real-time monitor and the online update of the signature database are enabled. • Whether the personal firewall is installed, and whether the real-time protection is enabled.
	Whether the IE version and security level reach the specified requirements.
Other configurations	Whether the specified processes are running.
	Whether the specified services are installed.
	Whether the specified services are running.
	Whether the specified registry key values exist.
	Whether the specified files exist in the system.

Role Based Access Control and Host Checking Procedure

Role Based Access Control (RBAC) means that the permission of the user is not determined by his user name, but his role. The resources can be accessed by a user after the login is determined by his corresponding role. So role is the bridge connecting the user and permission.

The SSL VPN host checking function supports RBAC. And the concepts of primary role and guest role are introduced in the host checking procedure. The primary role determines which host checking profile (contains the host checking contents and the security level) will be applied to the user and what access permission can the user have if he passes the host checking. The guest role determines the access permissions for the users who fail the host checking.

The host checking procedure is shown as below

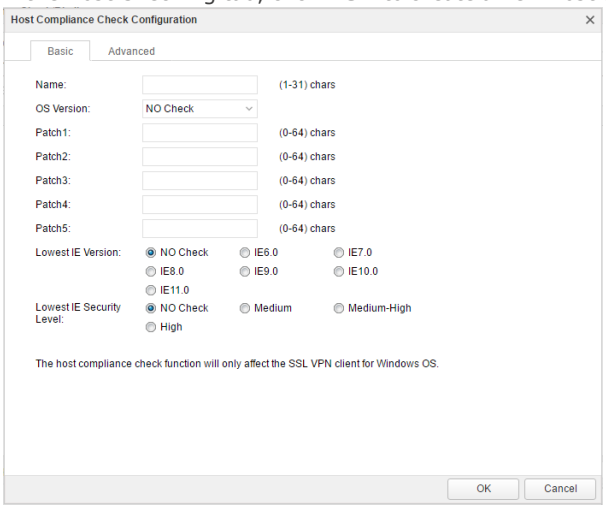
1. The SSL VPN client sends request for connection and passes the authentication.
2. The SSL VPN server sends the host checking profile to the client.
3. The client checks the host security status according to the items in the host checking profile. If it fails the host checking, system will be notified of the checking result.
4. The client sends the checking result back to the server.
5. The server disconnects the connection to the failed client or gives the guest role's access permission to the failed client.

The host checking function also supports dynamic access permission control. On one side, when the client's security status changes, the server will send a new host checking profile to the client to make him re-check; on the other side, the client can perform security checks periodically. For example, if the AV software is disabled and is detected by the host checking function, the role assigned to the client may change as will the access permissions.

Configuring a Host Checking Profile

To configuring host checking profile, take the following steps:

1. Select **Network > VPN > SSL VPN**.
2. At the top right corner, click **Host Checking/Binding** to visit the Host Checking/Binding page.
3. In the Host Checking tab, click **New** to create a new host checking rule.



In the Basic tab, configure the corresponding options.

Option	Description
Hostname	Specifies the name of the host checking profile.
OS Version	Specifies whether to check the OS version on the client host. Click one of the following options: • No Check: Do not check the OS version. • Must Match: The OS version running on the client host must be the same as the version specified here. Select the OS version and service pack version from the drop-down lists respectively. • At Least: The OS version running on the client host should not be lower than the version specified here. Select the OS version and service pack version from the drop-down lists respectively.
Patch1/2/3/4/5	Specifies the patch that must be installed on the client host. Type the patch name into the box. Up to 5 patches can be specified.
Lowest IE Version	Specifies the lowest IE version in the Internet zone on the client host. The IE version running on the client host should not be lower than the version specified here.
Lowest IE Security Level	Specifies the lowest IE security level on the client host. The IE security level on the host should not be lower than the level specified here.

In the Advanced tab, configure the corresponding options.

Option	Description

Security Center	Checks whether the security center is enabled on the client host.
Auto Update	Checks whether the Windows auto update function is enabled.
Anti-Virus Software	Checks the status and configurations of the anti-virus software: • Installed: The client host must have the AV software installed. • Monitor: The client host must enable the real-time monitor of the AV software. • Virus Signature DB Update: The client host must enable the signature database online update function.
Anti-spyware Software	Checks the status and configurations of the anti-spyware software: • Installed: The client host must have the anti-spyware installed. • Monitor: The client host must enable the real-time monitor of the anti-spyware. • Virus Signature DB Update: The client host must enable the signature database online update function.
Firewall	Checks the status and configurations of the firewall: • Installed: The client host must have the personal firewall installed. • Monitor: The client host must enable the real-time monitor function of the personal firewall.
Registry Key Value	
Key1/2/3/4/5	Checks whether the key value exists. Up to 5 key values can be configured. The check types are: • No Check: Do not check the key value. • Exist: The client host must have the key value. Type the value into the box. • Do not Exist: The client cannot have the key value. Type the value into the box.
File Path Name	
File1/2/3/4/5	Checks whether the file exists. Up to 5 files can be configured. The check types are: • No Check: Do not check file. • Exist: The client host must have the file. Type the value into the box. • Do not Exist: The client cannot have the file. Type the value into the box.
Running Process Name	
Process1/2/3/4/5	Checks whether the process is running. Up to 5 processes can be configured. The check types are: • No Check: Do not check the process. • Exist: The client host must have the process run. Type the process name into the box.

	• Do not Exist: The client cannot have the process run. Type the process name into the box.
Installed Service Name	
Service1/2/3/4/5	Checks whether the service is installed. Up to 5 services can be configured. The check types are: • No Check: Do not check the service. • Exist: The client host must have the service installed. Type the service name into the box. • Do not Exist: The client host cannot have the service installed. Type the service name into the box.
Running Service name	
Service1/2/3/4/5	Checks whether the service is running. Up to 5 services can be configured. The check types are: • No Check: Do not check the service. • Exist: The client host must have the service run. Type the service name into the box. • Do not Exist: The client host cannot have the service run. Type the service name into the box.

4. Click **OK** to save the settings.

SSL VPN Client for Windows

SSL VPN client for Windows is named Hillstone Secure Connect. Hillstone Secure Connect can be run with the following operating systems: Windows 2000/2003/XP/Vista/Windows 7/Windows 8/Windows 2008/Windows 10/Windows 2012. The encrypted data can be transmitted between the SSL VPN client and SSL VPN server after a connection has been established successfully. The functions of the client are:

- Get the interface and the route information of the PC on which the client is running.
- Show the connecting status, statistics, interface information, and route information.
- Show SSL VPN log messages.
- Upgrade the client software.
- Resolve the resource list information received from the server.

This section mainly describes how to download, install, start, uninstall the SSL VPN client, and its GUI and menu. The method for downloading, installing and starting the client may vary from the authentication methods configured on the server. The SSL VPN server supports the following authentication methods:

- Username/Password
- Username/Password + Digital Certificate
- Digital Certificate only

Downloading and Installing Secure Connect

When using the SSL VPN client for the first time, you need to download and install the client software Hillstone Secure Connect. This section describes three methods for downloading and installing the client software based on three available authentication methods. For the Username/Password + Digital Certificate authentication, the digital certificate can either be the USB Key certificate provided by the vendor, or the file certificate provided by the administrator.

Using Username/Password Authentication

When the Username/Password authentication is configured on the server, take the following steps to download and install the SSL VPN client software - Hillstone Secure Connect:

1. Visit the following URL with a web browser: https://IP-Address:Port-Number. In the URL, IP-Address and Port-Number refer to the IP address and HTTPS port number of the egress interface specified in the SSL VPN instance.
2. In the SSL VPN login page (shown in Figure 1), type the username and password into the **Username** and **Password** boxes respectively, and then click **Login**.
    - If the local authentication server is configured on the device, the username and password should already be configured on the device.
    - If "Radius authentication + RSA SecurID Token authentication by RSA Server" is configured on the device, and the user logs in for the first time, the username should be the username configured on the Radius server, and the password should be the dynamic Token password bound to the user. Click **Login**, and in the PIN Setting page (shown in Figure 2), set a PIN (4 to 8 digits). After the PIN has been set successfully, you will be prompted to login again with the new password (shown in Figure 3). Click **Login again** to return to the login page, type the correct username and new password, and click **Login**. The new password is PIN + dynamic Token password. For example, if the PIN is set to 54321, and the dynamic Token password is 808771, then the new password is 54321808771.
    - If "Radius authentication + RSA SecurID Token authentication by RSA Server" is configured on the device, but the user is not logging in for the first time, the username should be the username configured on the Radius server, and the password should be PIN + dynamic Token password.

Figure 1

Figure 2

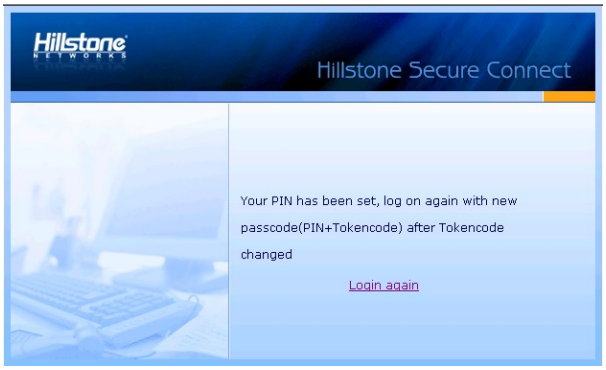


Figure 3

3. If SMS authentication is enabled on the SSL VPN server, the SMS Authentication dialog will appear. Type the authentication code and click Authenticate. If you have not received the authentication code within one minute, you can re-apply.

   - After passing the authentication, you have three chances to type the authentication code. If you give incorrect authentication code three times in succession, the connection will be disconnected automatically.
   - You have three chances to apply the authentication code, and the sending interval is one minute. Re-applying authentication code will void the old code, thus you must provide the latest code to pass the authentication.

4. After logging in, IE will download the client software automatically, and you can install it by following the prompts; for other web browsers, e.g., Firefox, you should click **Download** to download the client software scvpn.exe first, and then double click it to install.

A virtual network adapter will be installed on your PC together with Secure Connect. It is used to transmit encrypted data between the SSL VPN server and client.

Using Username/Password + Digital Certificate Authentication

When the Username/Password + Digital Certificate authentication is configured on the server, take the following steps to download and install the SSL VPN client software - Hillstone Secure Connect:

1. Insert the USB Key to the USB port of the PC, or import the file certificate provided by the administrator manually.
2. Visit the following URL with a web browser: https://IP-Address:Port-Number. In the URL, IP-Address and Port-Number refer to the IP address and HTTPS port number of the egress interface specified in the SSL VPN instance.
3. In the Select Digital Certificate dialog box, select the certificate you want and click **OK**. If USB Key certificate is selected, in the pop-up dialog box, provide the UKey PIN code (1111 by default) and click **OK**.
4. In the SSL VPN login page shown below, type the username and password into the **Username** and **Password** boxes respectively, and then click **Login**. The login user should be configured before in the device.

5. If SMS authentication is enabled on the SSL VPN server, the SMS Authentication dialog box will appear. Type the authentication code and click **Authenticate**. If you have not received the authentication code within one minute, you can re-apply.
   - After passing the authentication, you have three chances to type the authentication code. If you give incorrect authentication code three times in succession, the connection will be disconnected automatically.
   - You have three chances to apply the authentication code, and the sending interval is one minute. Re-applying authentication code will void the old code, thus you must provide the latest code to pass the authentication.
6. After logging in, IE will download the client software automatically, and you can install it by following the prompts; for other web browsers, e.g., Firefox, you should click **Download** to download the client software scvpn.exe first, and then double click it to install.

A virtual network adapter will be installed on your PC together with Secure Connect. It is used to transmit encrypted data between the SSL VPN server and client.

Using Digital Certificate Only

When only the Digital Certificate authentication is configured on the server, take the following steps to download and install the SSL VPN client software - Hillstone Secure Connect:

1. Insert the USB Key to the USB port of the PC, or import the file certificate provided by the administrator manually.
2. Visit the following URL with a web browser: https://IP-Address:Port-Number. In the URL, IP-Address and Port-Number refer to the IP address and HTTPS port number of the egress interface specified in the SSL VPN instance.
3. In the Select Digital Certificate dialog box, select the certificate you want and click **OK**. If USB Key certificate is selected, in the Enter Password dialog box, provide the UKey user password (1111 by default) and click **OK**.
4. After logging in, IE will download the client software automatically, and you can install it by following the prompts; for other web browsers, e.g., Firefox, you should click **Download** to download the client software scvpn.exe first, and then double click it to install.

A virtual network adapter will be installed on your PC together with Secure Connect. It is used to transmit encrypted data between the SSL VPN server and client.

Starting Secure Connect

After installing Secure Connect on your PC, you can start it in two ways:

- Starting via Web
- Starting directly

Starting via Web

This section describes how to start Secure Connect via Web based on the three authentication methods configured on the server. For the Username/Password + Digital Certificate authentication, the digital certificate can either be the USB Key certificate provided by the vendor, or the file certificate provided by the administrator.

Using Username/Password Authentication

When the Username/Password authentication is configured on the server, take the following steps to start Secure Connect via web:

1. Type the URL https://IP-Address:Port-Number into the address bar of your web browser.
2. In the login page (shown in Figure 4), type the username and password into the **Username** and **Password** boxes respectively, and then click **Login**.
   - If local authentication server is configured on the device, the username and password should be configured before on the device;
   - If "Radius authentication + RSA SecurID Token authentication by RSA Server" is configured on the device, and the user logs in for the first time, the username should be the username configured on the Radius server, and the password should be the dynamic Token password bound to the user. Click **Login**, and in the PIN Setting page (shown in Figure 5), set a PIN (4 to 8 digits). After the PIN has been set successfully, you will be prompted to login again with the new password (shown in Figure 6). Click **Login again** to return to the login page, type the correct username and new password, and click **Login**. The new password is PIN + dynamic Token password. For example, if the PIN is set to 54321, and the dynamic Token password is 808771, then the new password is 54321808771.
   - If "Radius authentication + RSA SecurID Token authentication by RSA Server" is configured on the device, but the user is not logging in for the first time, the username should be the username configured on the Radius server, and the password should be PIN + dynamic Token password.

Figure 4

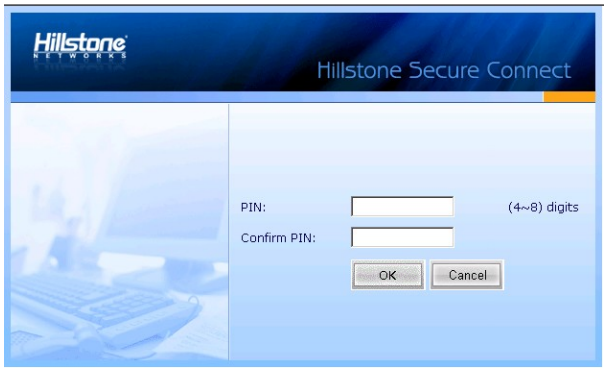


Figure 5

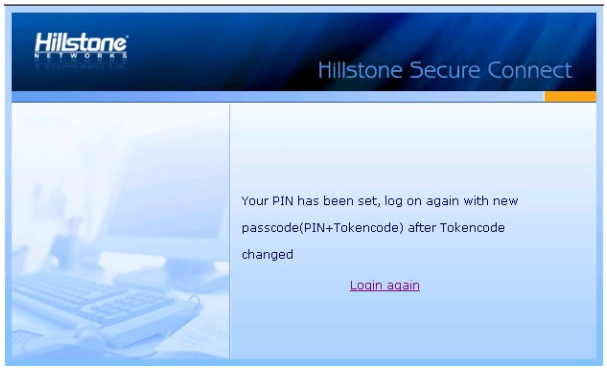


Figure 6

3. If the SMS authentication function is enabled, type the SMS authentication code into the box, and then click **Authenticate**. If you have not received the code within one minute, you can re-apply.

   - After passing the authentication, you have three chances to type the authentication code. If you give incorrect authentication code three times in succession, the connection will be disconnected automatically.
   - You have three chances to apply the authentication code, and the sending interval is one minute. Re-applying authentication code will void the old code, thus you must provide the latest code to pass the authentication.

After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using Username/Password + USB Key Certificate Authentication

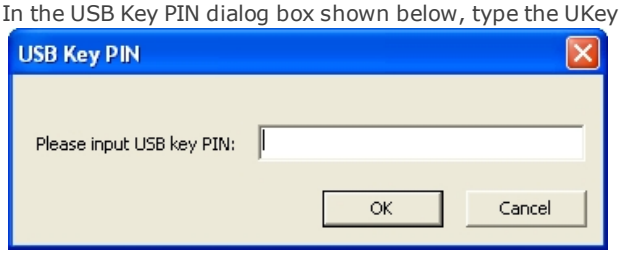
When the Username/Password + Digital Certificate authentication for the USB Key certificate is configured on the server, to start Secure Connect via web, take the following steps:

1. Insert the USB Key to the USB port of the PC.
2. Type the URL https://IP-Address:Port-Number into the address bar of your web browser.
3. In the Select Digital Certificate dialog box, select the digital certificate you want and click **OK**. In the Enter Password dialog box, provide the UKey user password (1111 by default) and click **OK**.
4. In the SSL VPN login page shown below, type the username and password into the **Username** and **Password** boxes respectively, and then click **Login**. The login user should already be configured on the device.

5. If the SMS authentication function is enabled, type the SMS authentication code into the box, and then click **Authenticate**. If you have not received the code within one minute, you can re-apply.

   - After passing the authentication, you have three chances to type the authentication code. If you give incorrect authentication code three times in succession, the connection will be disconnected automatically.
   - You have three chances to apply the authentication code, and the sending interval is one minute. Re-applying authentication code will void the old code, thus you must provide the latest code to pass the authentication.

6. In the USB Key PIN dialog box shown below, type the UKey PIN (1111 by default), and click **OK**.



After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon () will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using Username/Password + File Certificate Authentication

When the Username/Password + Digital Certificate authentication for the file certificate is configured on the server, to start the Secure Connect via web, take the following steps:

1. Import the file certificate provided by the administrator manually.
2. Type the URL https://IP-Address:Port-Number into the address bar of your web browser.
3. In the Select Digital Certificate dialog box, select the digital certificate you want and click **OK**.
4. In the SSL VPN login page shown below, type the username and password into the **Username** and **Password** boxes respectively, and then click **Login**. The login user should already be configured on the device.

5. If the SMS authentication function is enabled, type the SMS authentication code into the box, and then click **Authenticate**. If you have not received the code within one minute, you can re-apply.

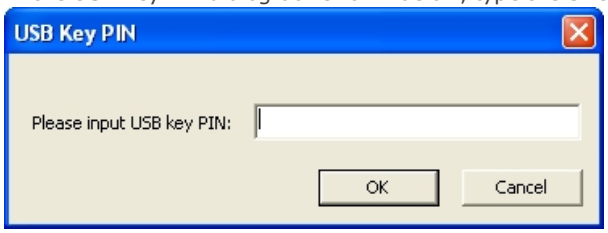
   - After passing the authentication, you have three chances to type the authentication code. If you give incorrect authentication code three times in succession, the connection will be disconnected automatically.
   - You have three chances to apply the authentication code, and the sending interval is one minute. Re-applying authentication code will void the old code, thus you must provide the latest code to pass the authentication.

After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using USB Key Certificate Only Authentication

When the Digital Certificate only authentication for the USB Key certificate is configured on the server, to start the Secure Connect via web, take the following steps:

1. Insert the USB Key to the USB port of the PC.
2. Type the URL https://IP-Address:Port-Number into the address bar of your web browser.
3. In the Select Digital Certificate dialog box, select the digital certificate you want and click **OK**. In the Enter Password dialog box, provide the UKey user password (1111 by default) and click **OK**.
4. In the USB Key PIN dialog box shown below, type the UKey PIN (1111 by default), and click **OK**.



After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using File Certificate Only Authentication

When the Digital Certificate only authentication for the file certificate is configured on the server, to start the Secure Connect via web, take the following steps:

1. Import the file certificate provided by the administrator manually.
2. Type the URL https://IP-Address:Port-Number into the address bar of your web browser.

3. In the Select Digital Certificate dialog box, select the digital certificate you want and click **OK**.

After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Starting Directly

This section describes how to start Secure Connect directly based on the three authentication methods configured on the server.

Starting the Software Based on TLS/SSL Protocol

For the Username/Password + Digital Certificate authentication, the digital certificate can either be the USB Key certificate provided by the vendor, or the file certificate provided by the administrator.

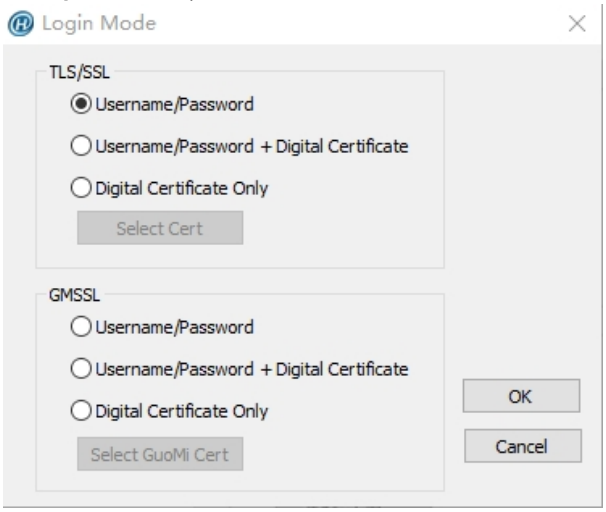
The starting mode based on TLS/SSL protocol are as follows:

- Username/Password
- Username/Password + USB Key Certificate
- Username/Password + File Certificate
- USB Key Certificate Only
- File Certificate Only

Using Username/Password Authentication

When the Username/Password authentication is configured on the server, to start the Secure Connect directly, take the following steps:

1. On your PC, double click the shortcut of Hillstone Secure Connect on your desktop.
2. In the Login dialog box, click **Mode**. In the Login Mode dialog shown below, in **TLS/SSL** section, click **Username/Password**, and then click **OK**.



3. In the Login dialog box of the Username/Password authentication mode (shown in Figure 7), configure the options to login.

Option	Description
Saved Connection	Provides the connection information you have filled before. Select a connection from the drop-down list.

Option	Description
Server	Enter the IP address of SSL VPN server.
Port	Enter the HTTPS port number of SSL VPN server.
Username	Enter the name of the login user.
Password	Enter the password of the login user.

- If the local authentication server is configured on the device, the username and password should already be configured on the device.
- If "Radius authentication + RSA SecurID Token authentication by RSA Server" is configured on the device, and the user logs in for the first time, the username should be the username configured on the Radius server, and the password should be the dynamic Token password bound to the user. Click **Login**, and in the PIN Setting page (shown in Figure 8), set a PIN (4 to 8 digits). After the PIN has been set successfully, you will be prompted to login again with the new password (shown in Figure 9). Click **Login again** to return to the login page, type the correct username and new password, and click **Login**. The new password is PIN + dynamic Token password. For example, if the PIN is set to 54321, and the dynamic Token password is 808771, then the new password is 54321808771.
- If "Radius authentication + RSA SecurID Token authentication by RSA Server" is configured on the device, but the user is not logging in for the first time, the username should be the username configured on the Radius server, and the password should be PIN + dynamic Token password.

Figure 7

Figure 8

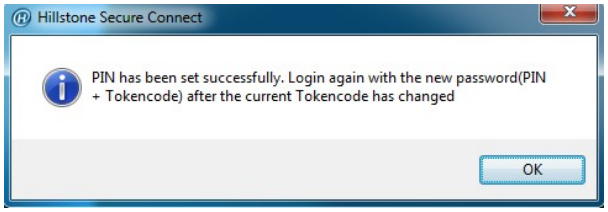
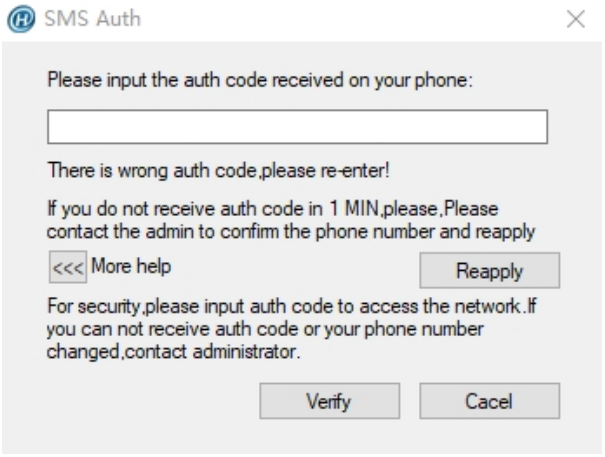


Figure 9

4. Click **Login**. If SMS authentication is enabled, type the authentication code into the box in the SMS Auth dialog (as shown below) and click **Verify**. If you have not received the authentication code within one minute, you can re-apply by clicking **Reapply**.

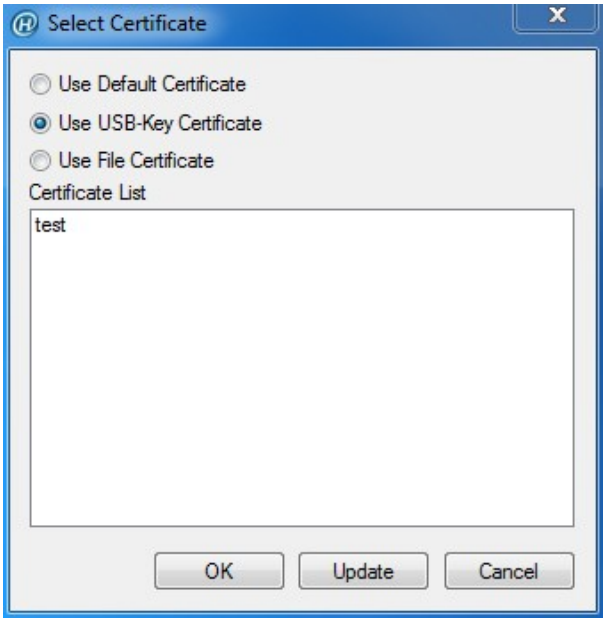


Finishing the above steps, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. And the encrypted communication between the client and server can be implemented now.

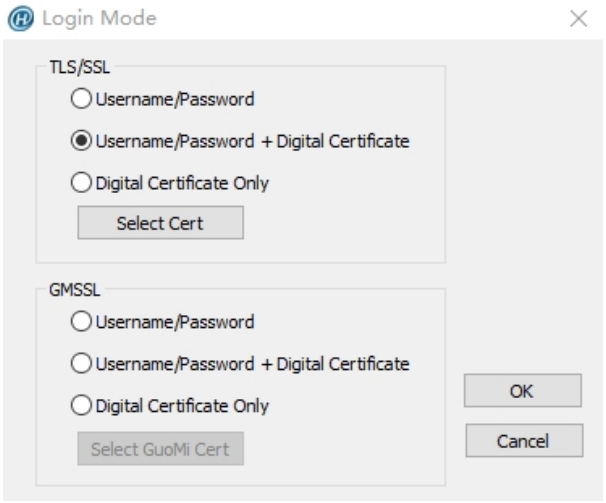
Using Username/Password + USB Key Certificate Authentication

When the Username/Password + Digital Certificate authentication is configured on the server, for the USB Key certificate, to start Secure Connect directly, take the following steps:

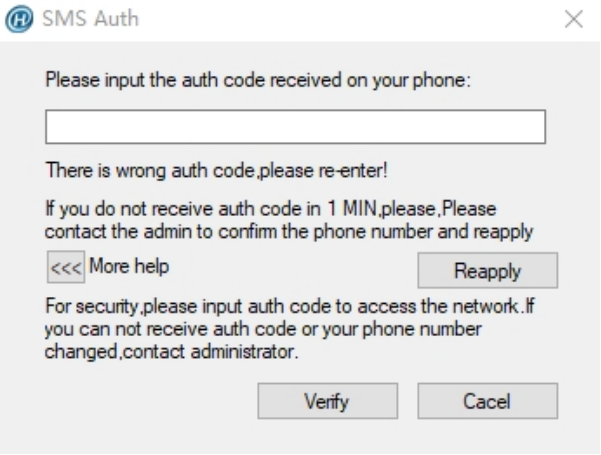
1. Insert the USB Key to the USB port of the PC.
2. In your PC, double click the shortcut to Hillstone Secure Connect on your desktop.
3. In the Login dialog box, click **Mode**. In the Login Mode dialog box, first click **Username/Password + Digital Certificate** in **TLS/SSL** section, and if necessary, click **Select Cert**. In the Select Certificate dialog box shown below, select a USB Key certificate. If the USB Key certificate is not listed, click **Update**. The client will send the selected certificate to the server for authentication. Finally click **OK**.



4. In the Login dialog of the Username/Password + Digital Certificate authentication mode (as shown below), configure the options to login.



5. Click **Login**. If SMS authentication is enabled, type the authentication code into the box in the SMS Auth dialog (as shown below) and click **Verify**. If you have not received the authentication code within one minute, you can re-apply by clicking **Reapply**.

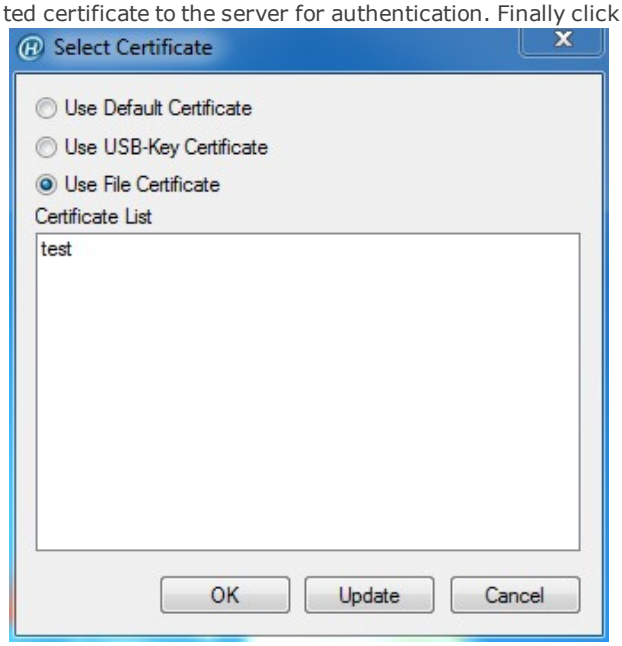


After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using Username/Password + File Certificate Authentication

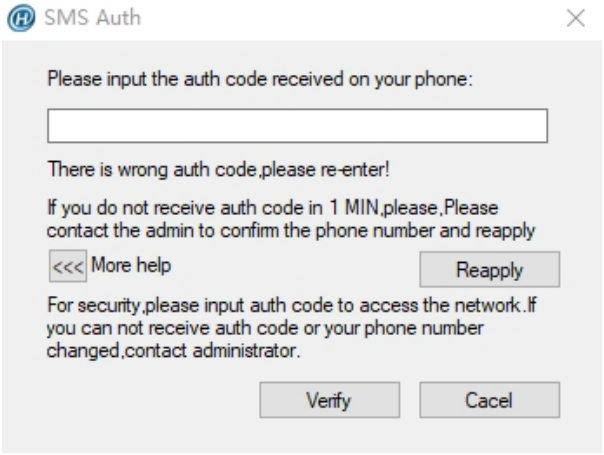
When the Username/Password + Digital Certificate authentication for the USB Key certificate is configured on the server, to start the Secure Connect directly, take the following steps:

1. Import the file certificate provided by the administrator manually.
2. On your PC, double click the shortcut to Hillstone Secure Connect on your desktop.
3. In the Login dialog box, click **Mode**. In the Login Mode dialog, first click **Username/Password + Digital Certificate**in **TLS/SSL** section, and if necessary, click **Select Certificate**. In the Select Certificate dialog box shown below, select a file certificate. If the file certificate is not listed, click **Update**. The client will send the selected certificate to the server for authentication. Finally click **OK**.



4. In the Login dialog box of the Username/Password + Digital Certificate authentication mode (as shown below), configure the options to login.

5. Click **Login**. If SMS authentication is enabled, type the authentication code into the box in the SMS Auth dialog box (as shown below) and click **Verify**. If you have not received the authentication code in one minute, you can re-apply by clicking **Reapply**.



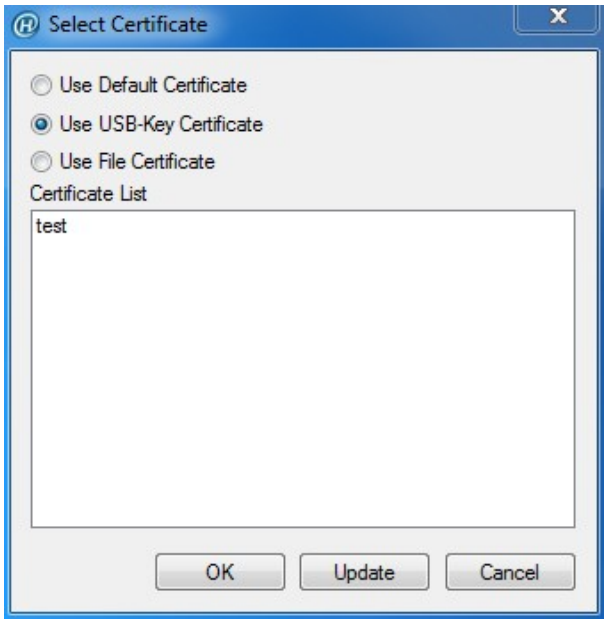
After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using USB Key Certificate Only

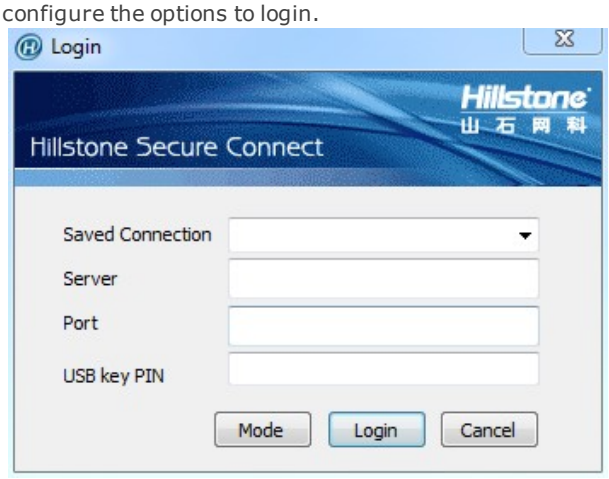
When the Username/Password + Digital Certificate authentication for the file certificate is configured on the server, to start the Secure Connect directly, take the following steps:

1. Insert the USB Key to the USB port of the PC.
2. On your PC, double click the shortcut to Hillstone Secure Connect on your desktop.
3. In the Login dialog box, click **Mode**. In the Login Mode dialog box, first click **Username/Password + Digital Certificate** in **TLS/SSL** section, and if necessary, click **Select Certificate**. In the Select Certificate dialog box shown below, select a USB Key certificate. If the USB Key certificate is not listed, click **Update**. The client will

send the selected certificate to the server for authentication. Finally click **OK**.



4. In the Login dialog box of the Username/Password + Digital Certificate authentication mode (as shown below), configure the options to login.



5. Finishing the above configuration, click **Login**.

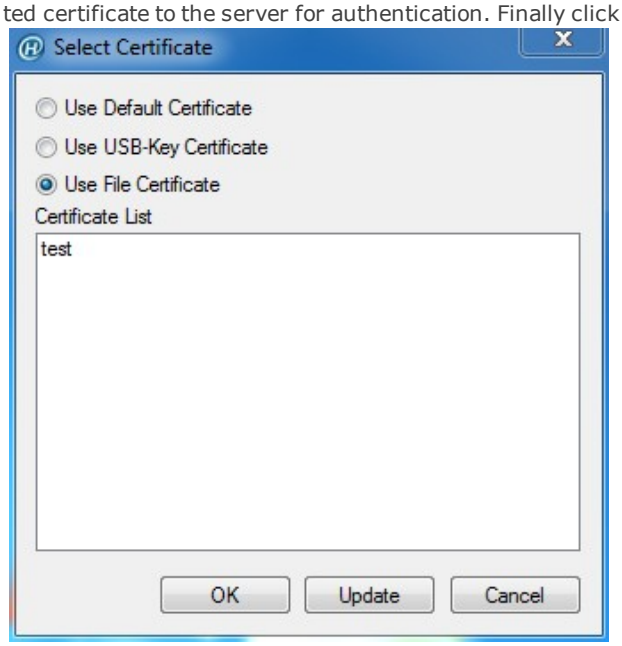
After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Using File Certificate Only

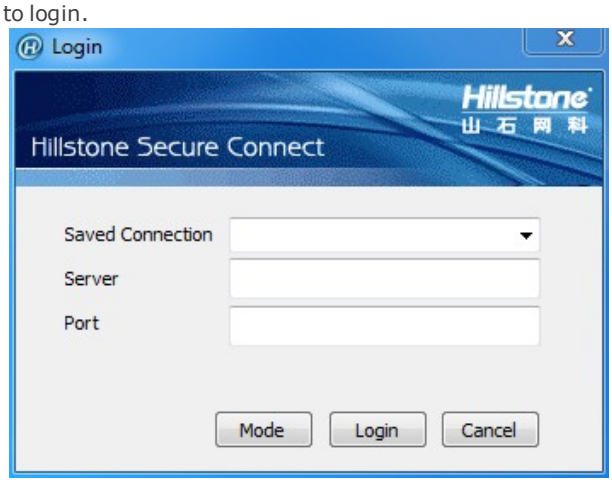
When the Digital Certificate Only authentication for the USB Key certificate is configured on the server, to start the Secure Connect directly, take the following steps:

1. Import the file certificate provided by the administrator manually.
2. On your PC, double click the shortcut to Hillstone Secure Connect on your desktop.
3. In the Login dialog box, click **Mode**. In the Login Mode dialog box, first click **Username/Password + Digital Certificate** in **TLS/SSL** section, and if necessary, click **Select Certificate**. In the Select Certificate dialog box

shown below, select a file certificate. If the file certificate is not listed, click **Update**. The client will send the selected certificate to the server for authentication. Finally click **OK**.



4. In the Login dialog box of the Digital Certificate Only authentication mode (as shown below), configure the options to login.



5. Finishing the above configuration, click **Login**.

After the above steps being finished, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. The encrypted communication between the client and server can be implemented now.

Starting the Software Based on GMSSL Protocol

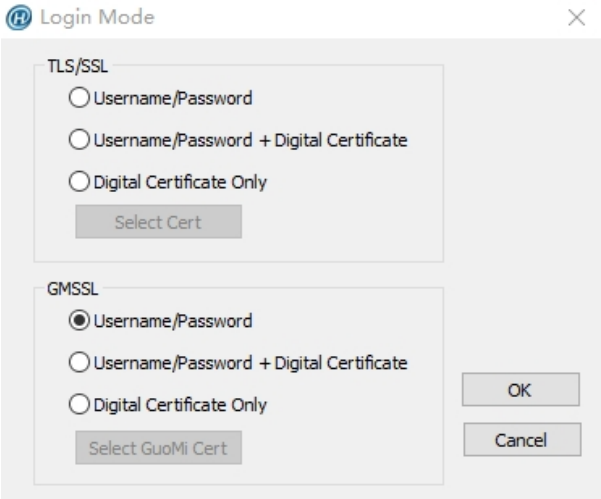
The starting mode based on GMSSL protocol are as follows:

- Username/Password
- Username/Password + Digital Certificate
- Digital Certificate Only

Using Username/Password Authentication

To start the Secure Connect client software, take the following steps:

1. On your PC, double click the shortcut of Hillstone Secure Connect on your desktop.
2. In the Login dialog box, click **Mode**. In the Login Mode dialog shown below, click **Username/Password** in **GMSSL** section,, and then click **OK**.



3. In the Login dialog box of the Username/Password authentication mode, configure the options to login.

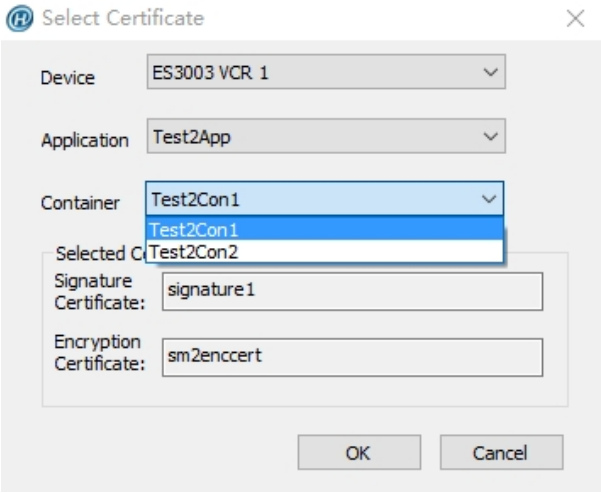
Option	Description
Saved Connection	Provides the connection information you have filled before. Select a connection from the drop-down list.
Server	Enter the IP address of SSL VPN server.
Port	Enter the HTTPS port number of SSL VPN server.
Username	Enter the name of the login user.
Password	Enter the password of the login user.

Finishing the above steps, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. And the encrypted communication between the client and server can be implemented now.

Using Username/Password + Digital Certificate Authentication

When the Username/Password + Digital Certificate authentication is configured on the server, for the USB Key certificate, to start the Secure Connect software directly, take the following steps:

1. Insert the USB Token to the USB port of the PC.
2. In your PC, double click the shortcut to Hillstone Secure Connect on your desktop.
3. In the Login dialog, click **Mode**. In the Login Mode dialog, first click **Username/Password + Digital Certificate** in **GMSSL** section, and if necessary, click **Select GuoMi Cert**. In the Select Certificate dialog as shown below, select a GM certificate. Finally click **OK**.



4. In the Select Certificate dialog box, configure the options to login.

Option	Description
Device	Select the current USB Token device name in the drop-down list.
Application	The application is a structure that contains a container, a device authentication key, and a file. Select the specified application name in the drop-down list.
Container	The container is the unique storage space in the USB Token device to save the key. It is used to store the encryption key pair, the encryption certificate corresponding to the encryption key pair, the signature key pair, and the signature certificate corresponding to the signature key pair. Select the name of the specified container in the drop-down list.
Signature Certificate	Display the name of the SM2 signature certificate in the specified container.
Encryption Certificate	Display the name of the SM2 encryption certificate in the specified container.

5. In the Login dialog of the Username/Password + Digital Certificate authentication mode as shown below, configure the options to login.

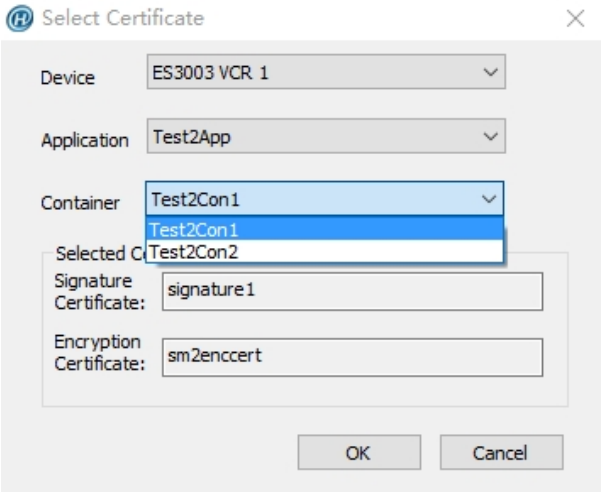
Option	Description
Saved Connection	Provides the connection information you have filled before. Select a connection from the drop-down list.
Server	Enter the IP address of SSL VPN server.
Port	Enter the HTTPS port number of SSL VPN server.
Username	Enter the name of the login user.
Password	Enter the password of the login user.
USB Key PIN	Enter the PIN code of the USB Key (1111 by default). One USB Key only corresponds to one password.

Finishing the above steps, the client will connect to the server automatically. After the connection has been established successfully, the icon ( ) will be displayed in the notification area. And the encrypted communication between the client and server can be implemented now.

Using Digital Certificate Only Authentication

When the Digital Certificate Only authentication is configured on the server, for the file certificate, to start the Secure Connect software directly, take the following steps:

1. Insert the USB Token to the USB port of the PC.
2. In your PC, double click the shortcut to Hillstone Secure Connect on your desktop.
3. In the Login dialog, click **Mode**. In the Login Mode dialog, first click **Digital Certificate only** in **GMSSL** section, and if necessary, click **Select GuoMi Cert**. In the Select Certificate dialog as shown below, select a GM certificate. Finally click **OK**.



4. In the Select Certificate dialog box, configure the options to login.

Option	Description
Device	Select the current USB Token device name in the drop-down list.
Application	The application is a structure that contains a container, a device authentication key, and a file. Select the specified application name in the drop-down list.
Container	The container is the unique storage space in the USB Token device to save the key. It is used to store the encryption key pair, the encryption certificate corresponding to the encryption key pair, the signature key pair, and the signature certificate corresponding to the signature key pair. Select the name of the specified container in the drop-down list.
Signature Certificate	Display the name of the SM2 signature certificate in the specified container.
Encryption Certificate	Display the name of the SM2 encryption certificate in the specified container.

5. In the Login dialog of the Digital Certificate Only authentication mode as shown below, configure the options to login.

Option	Description
Saved Connection	Provides the connection information you have filled before. Select a connection from the drop-down list.
Server	Enter the IP address of SSL VPN server.
Port	Enter the HTTPS port number of SSL VPN server.
USB Key PIN	Enter the PIN code of the USB Key (1111 by default). One USB Key only

Option	Description
	corresponds to one password.

6. Finish the above configuration, click **Login**.

Finishing the above steps, the client will connect to the server automatically. After the connection has been established successfully, the icon () will be displayed in the notification area. And the encrypted communication between the client and server can be implemented now.

Viewing Secure Connect GUI

Double click the Secure Connect icon () in the notification area, and the Network Information dialog box appears. This dialog box shows information about statistics, interfaces, and routes.

General

Descriptions of the options on the General tab:

Address Information	
Server	The IP address of the connected SSL VPN server.
Client	The IP address of the client.
Crypto Suite	
Cipher	The encryption algorithm and authentication algorithm used by SSL VPN.
Version	The SSL version used by SSL VPN.
Connection Status	
Status	The current connecting status between the client and server. The possible statuses are: connecting, connected, disconnecting, and disconnected.
IPCompress	
Algorithm	Shows the compression algorithm used by SSL VPN.
Tunnel Packets	
Sent	The number of sent packets through the SSL VPN tunnel.
Received	The number of received packets through the SSL VPN tunnel.
Tunnel Bytes	
Sent	The number of sent bytes through the SSL VPN tunnel.
Received	The number of received bytes through the SSL VPN tunnel.
Connected Time	
Duration	Shows the time period during which the client is online.
Compress Ratio	
Sent	Shows the length ratio of sent data after compression.
Received	Shows the length ratio of received data after compression.

Interface

Descriptions of the options on the Interface tab:

Option	Description
Adapter Name	The name of the adapter used to send SSL VPN encrypted data.
Adapter Type	The type of the adapter used to send SSL VPN encrypted data.
Adapter Status	The status of the adapter used to send SSL VPN encrypted data.

Option	Description
Physical Address	The MAC address of the interface used to send SSL VPN encrypted data.
IP Address Type	The type of the interface address used to send SSL VPN encrypted data.
Network Address	The IP address (allocated by SSL VPN server) of the interface used to send SSL VPN encrypted data.
Subnet Mask	The subnet mask of the interface used to send SSL VPN encrypted data.
Default Gateway	The gateway address of the interface used to send SSL VPN encrypted data.
DNS Server Address	The DNS server addresses used by the client.
WINS Address	The WINS server addresses used by the client.

Route

Description of the option on the Route tab:

Option	Description
Local LAN Routes	The routes used by the virtual network adapter.

Viewing Secure Connect Menu

Right-click the Secure Connect icon () in the notification area and the menu appears.

Descriptions of the menu items are as follows:

Option	Description
Network Information	Displays the related information in the Network Information dialog box.
Log	Shows Secure Connect log messages in the Log dialog box. This dialog box shows the main log messages. To view the detailed log messages, click **Detail**. Click **Clear** to remove the messages in the dialog box. Click **OK** to close the Log dialog box.
Debug	Configures Secure Connect's debug function in the Debug dialog box.
About	Shows Secure Connect related information in the About dialog box.
Connect	When Secure Connect is disconnected, click this menu item to connect.
Disconnect	When Secure Connect is connected, click this menu item to disconnect.
Option	Configures Secure Connect options, including login information, auto start, auto login, and so on. For more information, see "Configuring Secure Connect" on Page 175.
Exit	Click **Exit** to exit the client. If the client is connected to the server, the connection will be disconnected.

Configuring Secure Connect

You can configure Secure Connect in the Secure Connect Options dialog box(click **Option** from the client menu). The configurations include:

- Configuring General Options
- Configuring a Login Entry

Configuring General Options

In the Secure Connect Options dialog box, select **General** from the navigation pane and the general options will be displayed.

Descriptions of the options:

Option	Description
Auto Start	Select this check box to autorun the SSL VPN client when the PC is started.
Auto Login	Select this check box to allow the specified user to login automatically when the PC is started. Select the auto login user from the Default Connection drop-down list.
Auto Reconnect	Select this check box to allow the client to reconnect to the SSL VPN server automatically after an unexpected disconnection.
Select Cert	Click the button to select a USB Key certificate in the Select Certificate dialog box. This option is available when the USB KEY authentication is enabled.

Configuring a Login Entry

Login entry contains the login information for clients. The configured login entries will be displayed in the Saved Connection drop-down list in the Login dialog box. You can login by simply choosing the preferred connection instead of filling up the options in the Login dialog box.

To add a login entry, take the following steps:

1. In the Secure Connect Options dialog box, select **Saved Connection** from the navigation pane and the login options will be displayed.

   In the dialog box, configure the corresponding options.

Option	Description
Connection Name	Specifies the name for the connection to identify it. System will assign a name to the connection based on its server, port, and user automatically if this option is kept blank
Server	Specifies the IP address of the SSL VPN server.
Port	Specifies the HTTPS port number of the SSL VPN server.
Username	Specifies the login user.
Login Mode	Specifies the login mode. It can be one of the following options: • Password (the username/password authentication method). If **Password** is selected, select **Remember Password** to make system remember the password and type the password into the **Password** box. • Password + UKey (the USB KEY authentication method). If **Password + UKey** is selected, select **Remember PIN** to make system remember the PIN number and type PIN number into the **UKey PIN** box.
Proximity Auto Detection	Select the option to enable the optimal path detection function. For more information about optimal path detection, see "Configuring an SSL VPN" on Page 137.

2. Click **Apply**.

SSL VPN Client for Android

The SSL VPN client for Android is Hillstone Secure Connect. It can run on Android 4.0 and above. The functions of Hillstone Secure Connect contains the following items:

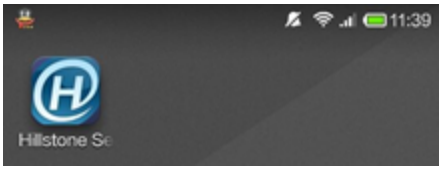
- Obtain the interface information of the Android OS.
- Display the connection status with the device, traffic statistics, interface information, and routing information.
- Display the log information of the application.

Downloading and Installing the Client

To download and install the client, take the following steps:

1. Visit http://www.hillstonenet.com/our-products/next-gen-firewalls-e-series/ to download the installation file of the client.
2. Use your mobile phone to scan the QR code of the client for Android at the right sidebar, and the URL of the client displays.
3. Open the URL and download the Hillstone-Secure-Connect-Versione_Number.apk file.
4. After downloading successfully, find this file in your mobile phone.
5. Click it and the installation starts.
6. Read the permission requirements.
7. Click **Install**.

After the client being installed successfully, the icon of Hillstone Secure Connect appears in the desktop as shown below:



Starting and Logging into the Client

To start and log into the client, take the following steps:

1. Click the icon of Hillstone Secure Connect. The login page appears.
2. **Provide the following information and then click Login.**
   - Please Choose: Select a login entry. A login entry stores the login information and it facilities your next login. For more information on login entry, see the Configuration Management section below.
   - Server: Enters the IP address or the server name of the device that acts as the VPN server.
   - Port: Enters the HTTPs port number of the device.
   - Username: Enters the username for logging into the VPN.
   - Password: Enters the corresponding password.
3. If the SSL VPN server enables the SMS authentication, the SMS authentication page will appear. In this page, enter the received authentication code and then submit it. If you do not receive the authentication code, you can request it after one minute.

After the client connecting to the SSL VPN server, the key icon () will appear at the notification area of your Android system.

GUI

After the client connects to the SSL VPN server, you can view the following pages: Connection Status page, Configuration Management page, Connection Log page, System Configuration page, and About Us page.

Connection Status

Click **Status** at the bottom of the page to enter into the **Connection Status** page and it displays the statistics and routing information:

- The Connection Time: Time period during which the client is online.
- Received Bytes: Shows the received bytes through the SSL VPN tunnel.
- Sent Bytes: Shows the sent bytes through the SSL VPN tunnel.
- Server: Shows the IP address or the server name of the device that client connects to.
- Port: Shows the HTTPs port number of the device.
- Account: Shows the username that logs into the VPN instance.
- Private Server Address: Shows the interface's IP address of the device that the client connects to.
- Client Private Address: Shows the IP address of the interface. This interface transmits the encrypted traffic and this IP address is assigned by the SSL VPN server.
- Address Mask: Shows the netmask of the IP address of the interface. This interface transmits the encrypted traffic.
- DNS Address: Shows the DNS Address used by the client.
- Routing Information: Shows the routing information for transmitting encrypted data.
- Disconnection Connection: Click this button to disconnect the current connection with the server.

Configuration Management

Click **VPN** at the bottom of the page to enter into the **Configuration Management** page. In this page, you can perform the following operations:

- Add/Edit/Delete a login entry
- Modify the login password
- Disconnect the connection with SSL VPN server
- Connect to the SSL VPN server

Adding a Login Entry

To facilitate the login process, you can add a login entry that stores the login information. The added login entry will display in the drop-down list of **Please Choose** in the login page. You can select a login entry and the login information will be filled in automatically.

To add a login entry, take the following steps:

1. In the Configuration Management page, click the  icon at the top-right corner.
2. **In the pop-up window, enter the following information:**
    a. Connection Name: Enter a name as an identifier for this login entry

b. Server: Enter the IP address or the server name of the device that acts as the VPN server.

c. Port: Enter the HTTPs port number of the device.

d. Username: Enter the username for logging into the VPN.

3. Click **Confirm** to save this login entry.

Editing a Login Entry

To edit a login entry, take the following steps:

1. In the login entry list, click the one that you want to edit and several buttons will appear.
2. Click **Edit** to make the Edit Configuration dialog box appear.
3. In the dialog box, edit the login entry.
4. Click **Confirm** to save the modifications.

Deleting a Login Entry

To delete a login entry, take the following steps:

1. In the login entry list, click the one that you want to delete and several buttons will appear.
2. Click **Delete**.
3. Click **Yes** in the pop-up dialog box to delete this login entry.

Modifying the Login Password

To modify the login password, take the following steps:

1. In the login entry list, click the one that you want to modify the password and several buttons will appear.
2. Click **Modify Password**.
3. Enter the current password and new password in the pop-up dialog box.
4. Click **Confirm** to save the settings.

Disconnecting the Connection or Logging into the Client

To disconnect the connection or log into the client, take the following steps:

1. In the login entry list, click a login entry and several buttons will appear.
2. If the connection status to this server is disconnected, you can click **Login** to log into the client; if the connection status is connected, you can click **Disconnect Connection** to disconnect the connection.
3. In the pop-up dialog box, confirm your operation.

Connection Log

Click **Log** at the bottom of the page to enter into the **Configuration Log** page. In this page, you can view the logs.

System Configuration

Click **Config** at the bottom of the page to enter into the **System Configuration** page. In this page, you can configure the following options:

- Auto Reconnect: After turning on this switch, the client wil automatically reconnect to the server if the connection is disconnected unexpectedly.

- Show Notify: After turning on this switch, the client icon will display in the notification area.
- Allow To Sleep: After turning on this switch, the client can stay connected while the Android system is in the sleep status. With this switch turned off, the client might disconnect the connection and cannot stay connected for a very long time while the Android system is in the sleep status.
- Auto Login: After turning on this switch, the client will automatically connect to the server when it starts. The server is the one that the client connects to the last time.
- Remember The Password: After turning on this switch, the client wil remember the password and automatically fill in the login entry.
- Exit: Click **Exit** to exit this application.

About Us

Click **About** at the bottom of the page to enter the About US page. This page displays the version information, contact information, copyright information, etc.

SSL VPN Client for iOS

The SSL VPN client for iOS is called Hillstone BYOD Client (HBC) and it supports iOS 6.0 and higher versions. HBC mainly has the following functions:

- Simplify the VPN creation process between the Apple device and the Hillstone device
- Display the VPN connection status between the Apple device and the Hillstone device
- Display the log information

To use the SSL VPN client for iOS, download and install the **Hillstone BYOD Client** app from the App Store.

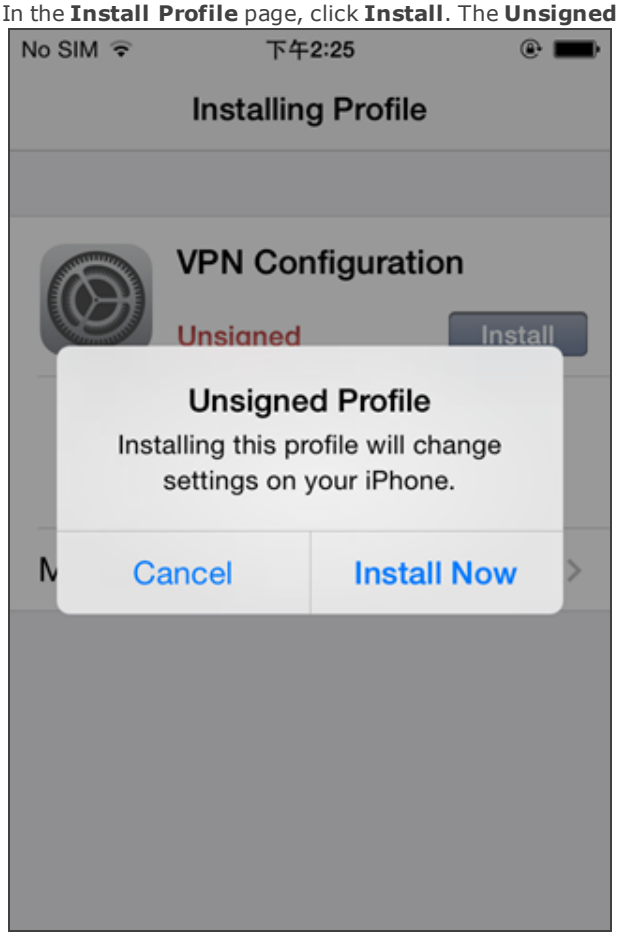
Deploying VPN Configurations

For the first-time logon, you need to deploy the VPN configurations, as shown below:

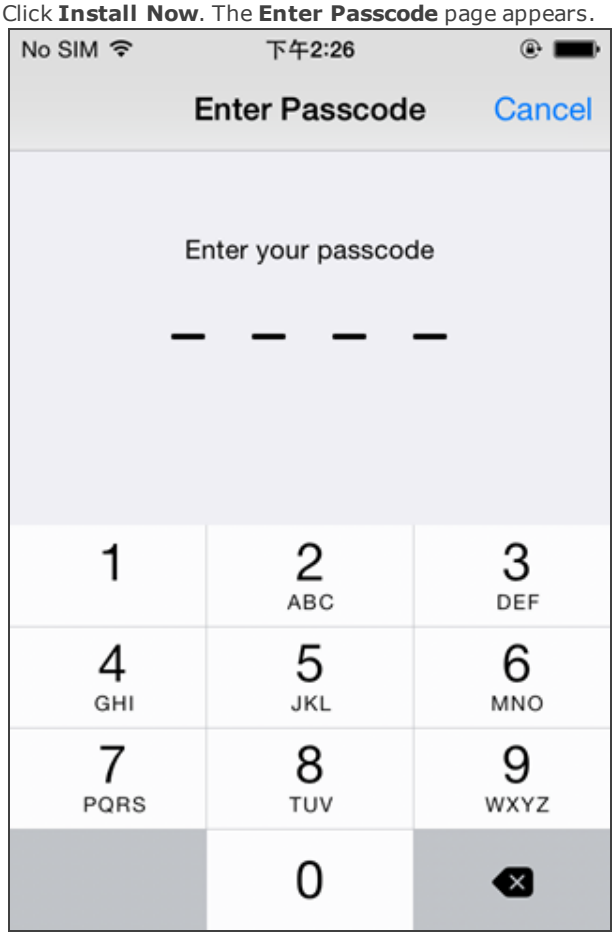
1. Click the HBC icon located at the desktop of iOS. The login page of HBC appears.
2. **In the login page, specify the following information and then click Login.**
   - Connection: Enter a name for this newly created connection instance.
   - Server: Enter the IP address or the server name of the device that acts as the VPN server.
   - Port: Enter the HTTPs port number of the device.
   - Username: Enter the username for logging into the VPN.
   - Password: Enter the corresponding password.
3. After logging the VPN server successfully, the **Install Profile** page pops up and the deployment process starts automatically.


No SIM
下午2:25
Cancel
Install Profile
VPN Configuration
Unsigned
Install
Description 描述文件描述。
Received 2014年10月15日
Contains VPN Settings
More Details

4. In the **Install Profile** page, click **Install**. The **Unsigned Profile** window pops up.



5. Click **Install Now**. The **Enter Passcode** page appears.



6. Enter your passcode. The passcode is the one for unlocking your iOS screen. With the correct passcode entered, iOS starts to install the profile.

7. After completing the installation, click **Done** in the **Profile Installed** page.

The profile deployed is for the instance with the above parameters (connection, server, port, username, and password). If the value of one parameter changes, you need to deploy the VPN configuration profile again.

Connecting to VPN

After the VPN configuration deployment is finished, take the following steps to connect to VPN:

1. Start HBC.
2. In the login page, enter the required information. The value of these parameters should be the ones that you have specified in the above section of Deploying VPN Configurations. If one of the parameter changes, you need to re-deploy the VPN configuration.
3. Click **Login**. HBC starts to connects to the Hillstone device.
4. Start **Settings** of iOS and navigate to **VPN**.
5. In the **VPN** page, select the configuration that has the same name as the one you configured in the section of Deploying VPN Configuration.
6. Click the **VPN** switch. iOS starts the VPN connection.
7. In this **VPN** page, when the **Status** value is **Connected**, it indicates the VPN between the iOS device and the Hillstone device has been established.

Introduction to GUI

After logging into HBC, you can view the following pages: Connection Status, Connection Log, and About US.

Connection Status

Click **Connection** at the bottom of the page to enter into the **Connection Status** page and it displays the current connection status. You can configure the following options:

- Remember password: Remembers the password for this connection instance.
- Import configuration: If HBC can connect to the Hillstone device successfully but the iOS VPN connection fails, you need to re-deploy the VPN configurations. After turning on this **Import configuration** switch, HBC will re-deploy the VPN configurations when you log in for the next time.

Connection Log

Click **Log** at the bottom of the page to enter into the **Connection Log** page and it displays the connection log messages.

About US

Click **About** at the bottom of the page to enter the **About Us** page and it displays the information of version, copyright, etc.

SSL VPN Client for Mac OS

The SSL VPN client for Mac OS is Hillstone Secure Connect. It can run on Mac OS X 10.6.8 and above. The encrypted data can be transmitted between the SSL VPN client and SSL VPN server after a connection has been established successfully. The functions of the client are:

- Establish the SSL VPN connection with the SSL VPN server.
- Show the connection status, traffic statistics, and route information.
- Show log messages.

Downloading and Installing Client

Visit http://www.hillstonenet.com/our-products/next-gen-firewalls-e-series/ to download the installation file of the client.

After downloading the installation file, double-click it. In the pop-up, drag SCVPN to Applications to perform the installation.

To open the installation file, you must have the administrator permission and select **Anywhere** in **System Preferences > Security & Privacy > General > Allow apps downloaded from**.

Starting Client and Establishing Connection

To start the client and establish the connection with the server side, take the following steps:

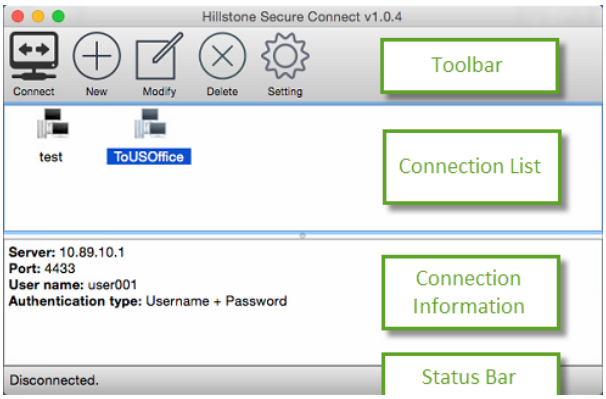
1. In Mac OS, select **Launchpad > SCVPN**. The client starts.
2. Click **New**. The **Create connection profile** window appears.
3. Provide the following information and then click **OK**.

   - **Name**: Specify a name for this VPN connection.
   - **Description**: Specify the description for this VPN connection.
   - **Server**: Enter the IP address or the server name of the device that acts as the VPN server.
   - **Port**: Enter the HTTPs port number of the device.
   - **User name**: Enter the login name.
   - **Password**: Enter the corresponding password.
   - **Remember password** : Select this check box to remember the password.
   - **GMSSL**: Select this check box to use the GM SSL protocol.
4. Select the connection name in the connection list.
5. In the toolbar, click **Connect**. If you do not select **Remember password** in step 3, enter the password in the pop-up and then click **OK**.

After the client connects to the SSL VPN server, the status bar displays **Connection established**. Meanwhile, the notification area of Mac displays  . The encrypted data can be transmitted between the SSL VPN client and SSL VPN server now.

GUI

The GUI of the client includes four areas: toolbar, connection list, connection information, and status bar.



Toolbar

In the toolbar, you can perform the following actions:

- Connect: Select a connection from the connection list and then click Connect. The client starts to establish the connection with server side.
- New: Create a new connection. For details, see Starting Client and Establishing Connection.

- Modify: Select a connection from the connection list and then click **Modify**. For details of modifying the parameters, see Starting Client and Establishing Connection.
- Delete: Select a connection from the connection list and then click **Delete** to delete this connection.
- Settings: Set to minimize the client when the connection is established and select whether to check the update of the client when it starts.
- Cancel: Click this button to cancel the connection. When the client is connecting to the server side, this button will display.
- Disconnect: Disconnect the current connection. After the connection is established, this button will display.
- Info: View the channel information and the route information of the current connection. After the connection is established, this button displays.

Connection List

Displays all created connections.

Connection Information

When selecting a connection in the connection list, the connection information area displays the corresponding information of this connection.

After establishing the connection, the connection information area displays the connection duration, server IP address, the IP assigned to the client, the number of packets sent/received through the SSL VPN tunnel, and the bytes sent/received through the SSL VPN tunnel.

Status Bar

Displays the connection status.

Menu

The **SCVPN** item in the menu includes the following options:

- About SCVPN: Displays the information of this client.
- Quit SCVPN: Quit the client.

The **Logging** item in the menu includes the following options:

- View: View the logs.
- Level: Select the log level. When selecting the lower level in the menu, the displayed logs will include the logs of upper level. However, when selecting the upper level in the menu, the displayed logs will not include the logs of lower level.

SSL VPN Client for Linux

The SSL VPN client for Linux is Hillstone Secure Connect. It can run on the following operation system.

- 64-bit desktop version of Ubuntu12.04 (GNOME desktop);
- 64-bit desktop version of Ubuntu14.04(GNOME desktop);
- 64-bit desktop version of Ubuntu Kylin16.04(default desktop);
- 64-bit desktop version of CentOS6.5(GNOME desktop);

The encrypted data can be transmitted between the SSL VPN client and SSL VPN server after a connection has been established successfully. The functions of the client are:

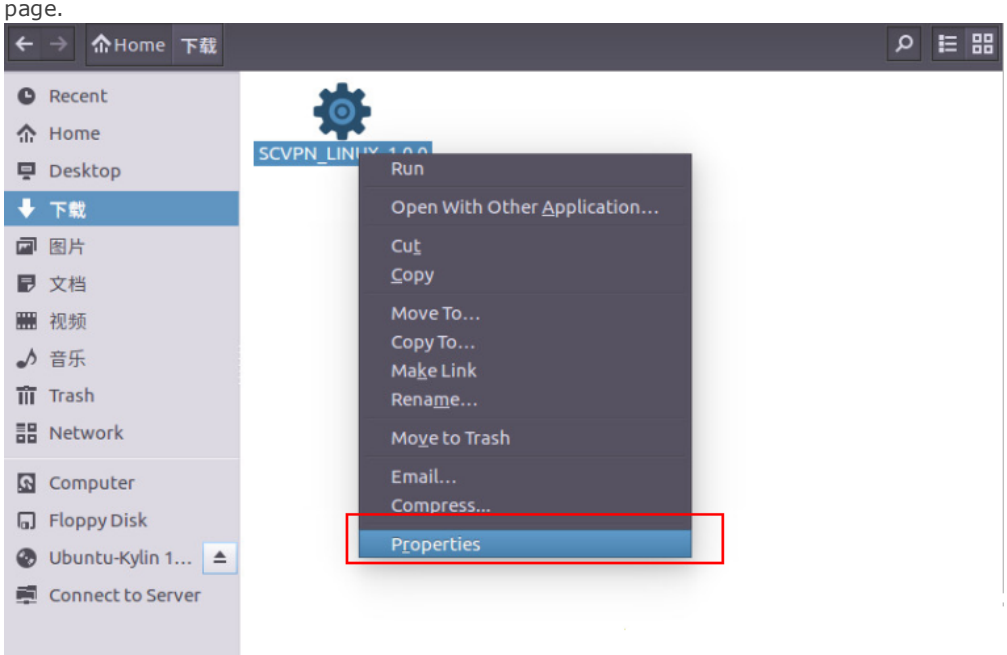
- Get interface and route information from the PC on which the client is running.
- Show the connection status, traffic statistics, and route information.
- Show log messages.

Take 64-bit Ubuntu Kylin16.04 desktop as an example to introduce downloading and installing client, starting client and establishing connection, upgrading and uninstalling client, the client GUI and menu. The client configuration of other three Linux systems can refer to 64-bit Ubuntu Kylin16.04 desktop.

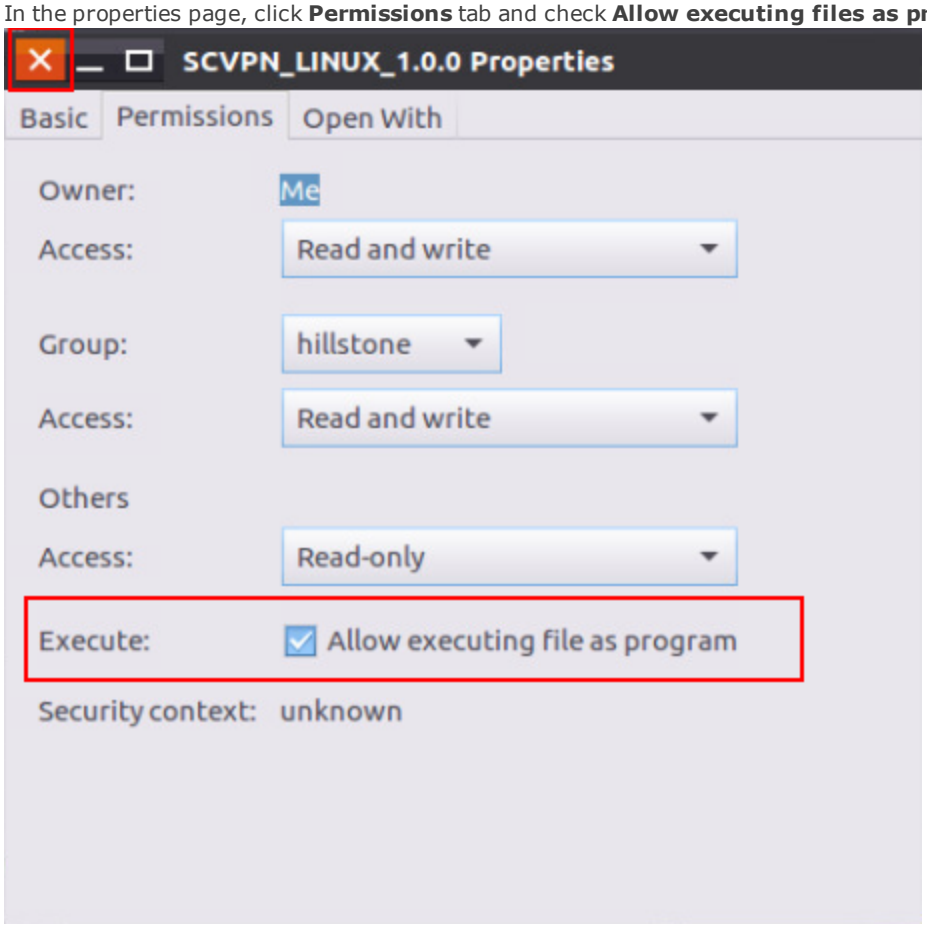
Downloading and Installing Client

Downloading and installing Hillstone Secure Connect, take the following steps:

1. Visit http://www.hillstonenet.com/our-products/next-gen-firewalls-e-series/ to download the installation file of the client.
2. After downloading the installation file, right-click the client icon and select **Properties** to go to the properties page.



3. In the properties page, click **Permissions** tab and check **Allow executing files as program**, then close it.

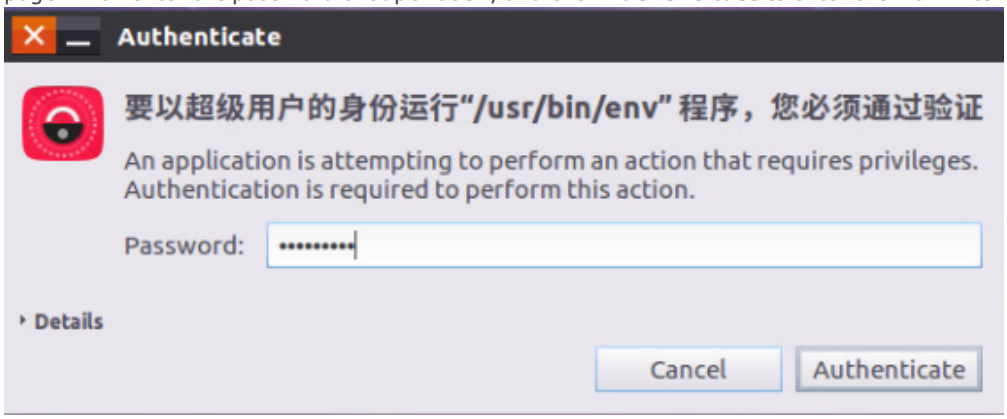


4. Double-click the client icon and follow the setup wizard to complete the installation.

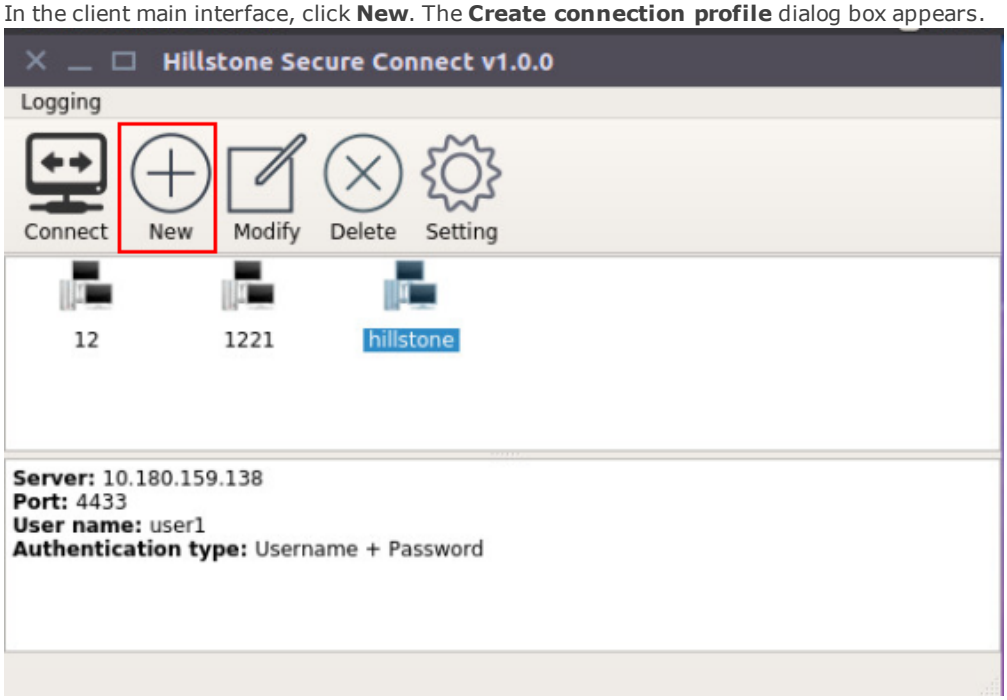
Starting Client and Establishing Connection

To start the client and establish the connection with the server side, take the following steps:

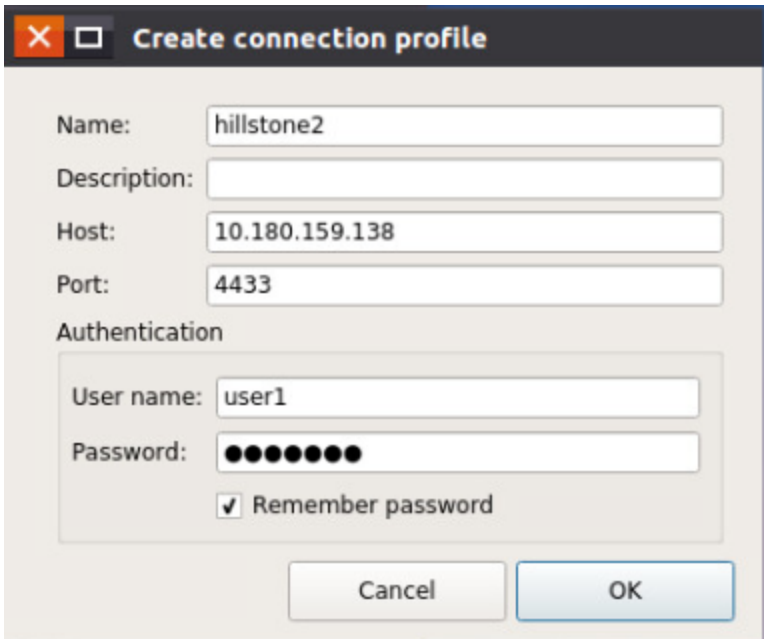
1. Double-click the SCVPN icon on the desktop of the Linux system, and system enters the super user authentication page. Then enter the password of super user , and click **Authenticate** to enter the main interface of the client.



2. In the client main interface, click **New**. The **Create connection profile** dialog box appears.



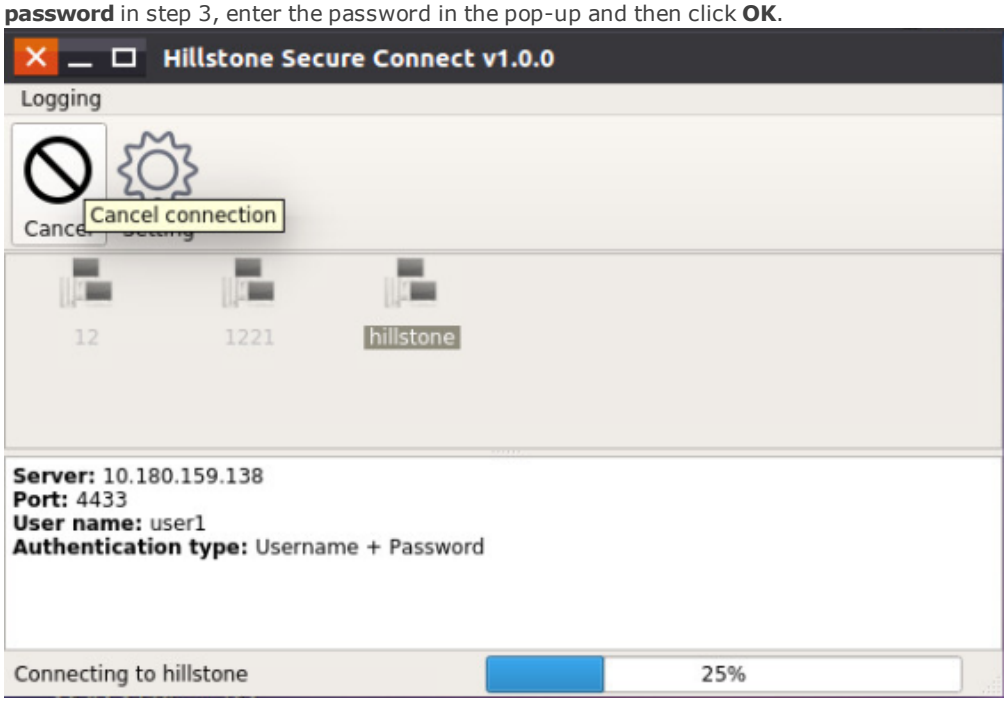
3. **Provide the following information and then click OK.**



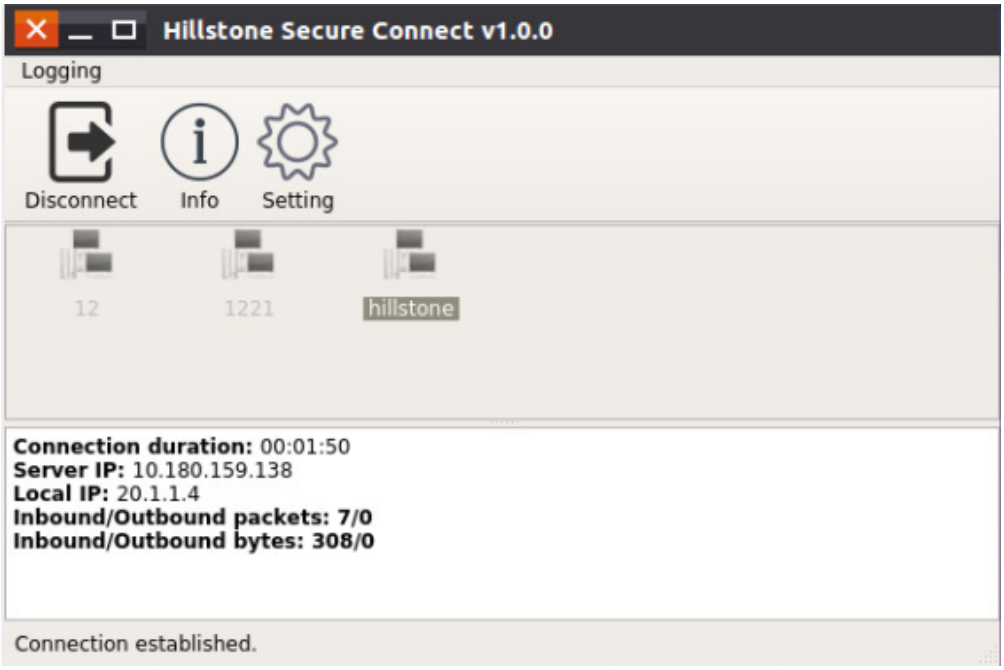
- **Name**: Specify a name for this VPN connection.
- **Description**: Specify the description for this VPN connection.
- **Server**: Enter the IP address or the server name of the device that acts as the VPN server.
- **Port**: Enter the HTTPs port number of the device.
- **User name**: Enter the login name. For detailed information, refer to "User" on Page 227.

- **Password**: Enter the corresponding password.
- **Remember password** : Select this check box to remember the password.

4. Select the connection name in the connection list. In the toolbar, click **Connect**. If you do not select **Remember password** in step 3, enter the password in the pop-up and then click **OK**.



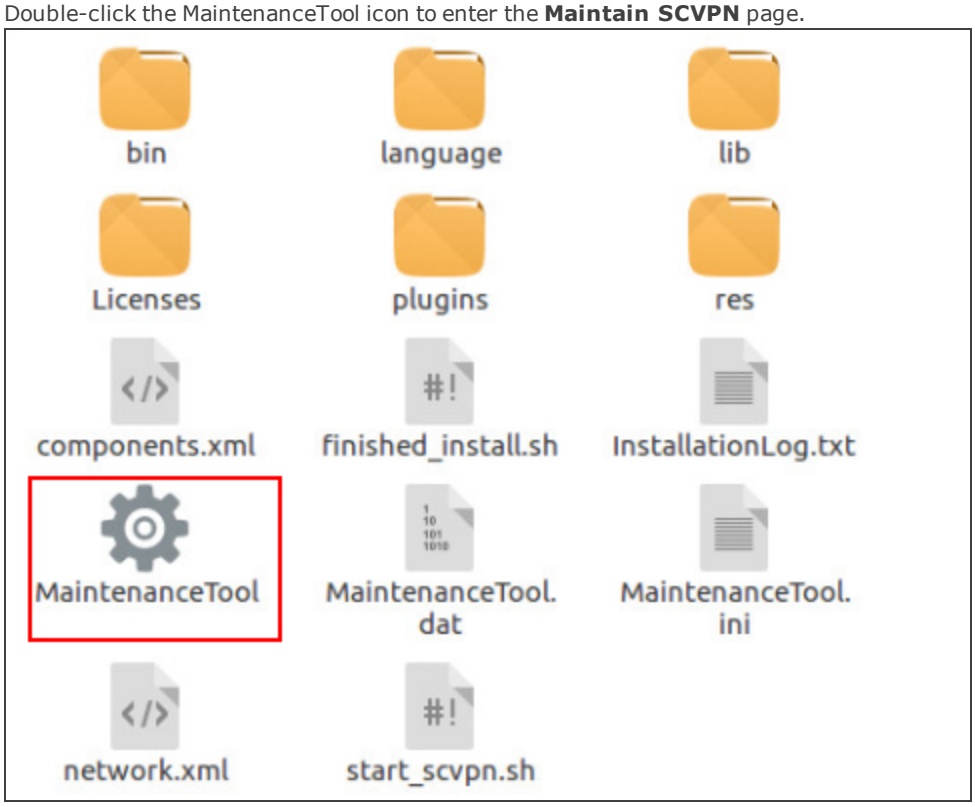
5. After the client connecting to the SSL VPN server, the status bar displays **Connection established**. The encrypted data can be transmitted between the SSL VPN client and SSL VPN server now.



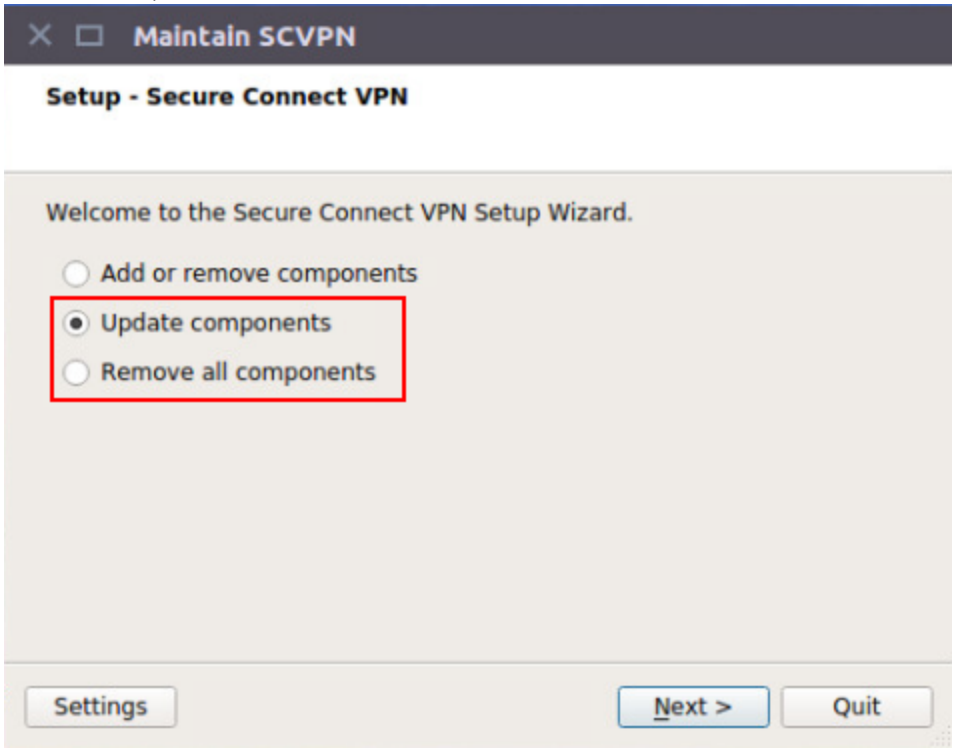
Upgrading and Uninstalling Client

To update and uninstall the SSL VPN Client, take the following steps:

1. Double-click the MaintenanceTool icon to enter the **Maintain SCVPN** page.



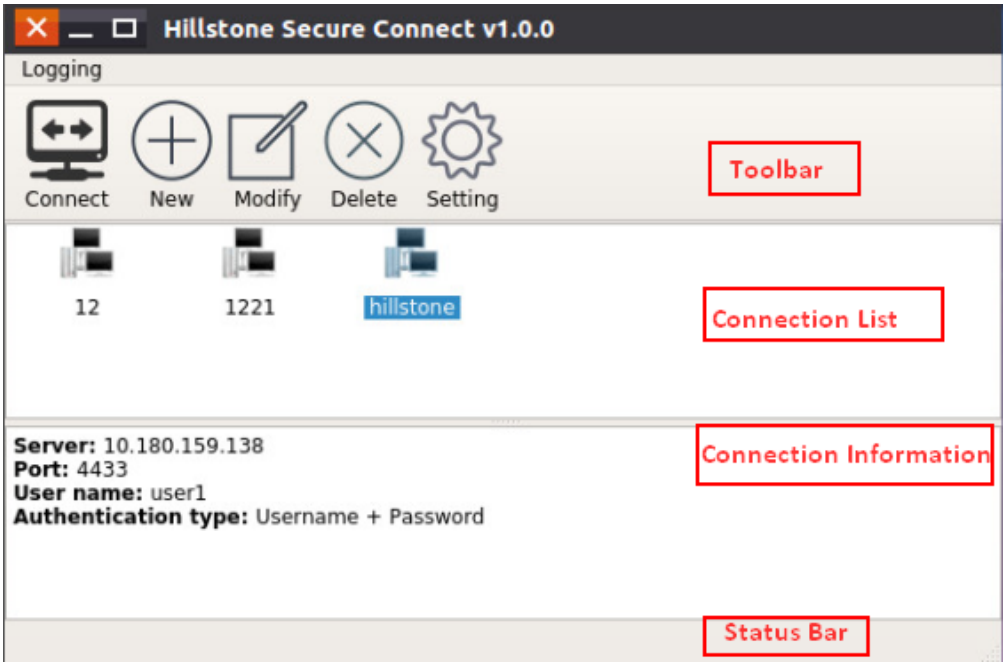
2. In the **Maintain SCVPN** page, select **Update components** or **Remove all components** to upgrade or uninstall the client, then click **Next**.



3. Follow the setup wizard to complete the upgrade or uninstall of client.

GUI

The GUI of the client includes four areas: toolbar, connection list, connection information, and status bar.



Toolbar

In the toolbar, you can perform the following actions:

- Connect: Select a connection from the connection list and then click **Connect**. The client starts to establish the connection with server side.
- New: Create a new connection. For details, see Starting Client and Establishing Connection.
- Modify: Select a connection from the connection list and then click **Modify**. For details about modifying the parameters, see Starting Client and Establishing Connection.
- Delete: Select a connection from the connection list and then click **Delete** to delete this connection.
- Settings: Set to minimize the client when the connection is established
- Cancel: Click this button to cancel the connection. When the client is connecting to the server side, this button is displayed. For more information, see Starting Client and Establishing Connection.
- Disconnect: Disconnect the current connection. After the connection is established, this button is displayed. For more information, see Starting Client and Establishing Connection.
- Info: View the channel information and the route information of the current connection. After the connection is established, this button is displayed. For more information, see Starting Client and Establishing Connection.

Connection List

Displays all created SSL VPN connections, and uses different icons to distinguish between the connected and the unconnected.

Connection Information

When selecting a connection in the connection list, the connection information area displays the corresponding information of this connection.

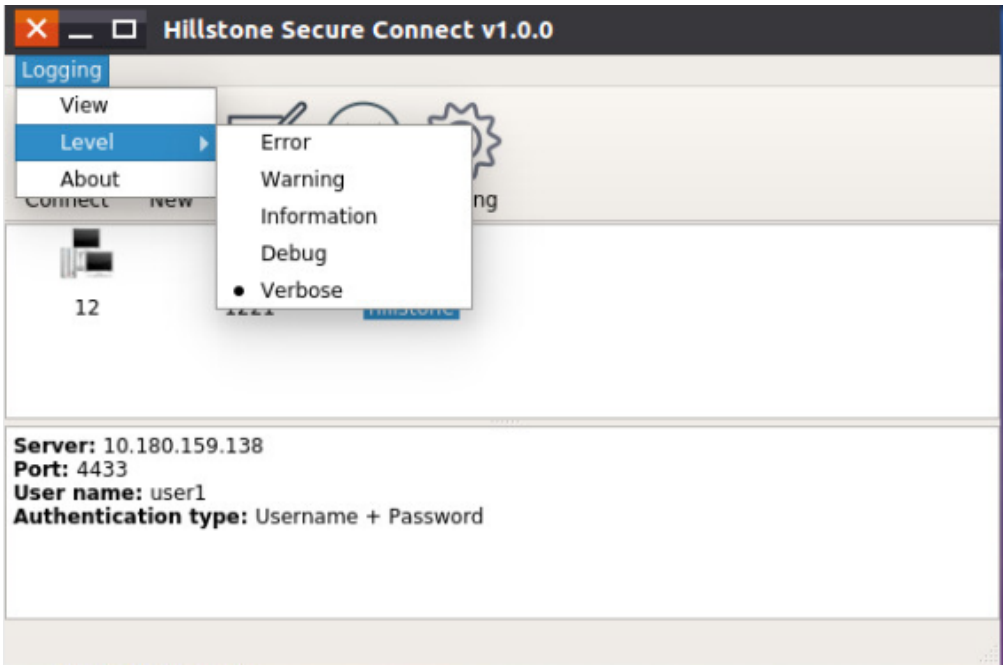
- When the client doesn't connect or has connected to the server, the connection information area displays the server IP address, the port number, the user name and the authentication type.
- After establishing the connection, the connection information area displays the connection duration, server IP address, the IP assigned to the client, the number of packets sent/received through the SSL VPN tunnel, and the bytes sent/received through the SSL VPN tunnel.

Status Bar

Displays the connection status and the connection progress when connecting to the server. For more information, see Starting Client and Establishing Connection.

Menu

Click the **logging** menu in the top-left corner of the client interface .



- View: View the logs.
- Level: Select the log level. When selecting a level in the menu, system will display the logs of upper levels and will not display the logs of lower levels.
- About: Display the version information, copyright information and other relevant information.

L2TP VPN

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

L2TP (Layer Two Tunneling Protocol) is a VPDN technique that allows dial-up users to launch VPN connection from L2TP clients or L2TP access concentrators (LAC), and connect to a L2TP network server (LNS) via PPP. After the connection has been established successfully, LNS will assign IP addresses to legal users and permit them to access the private network.

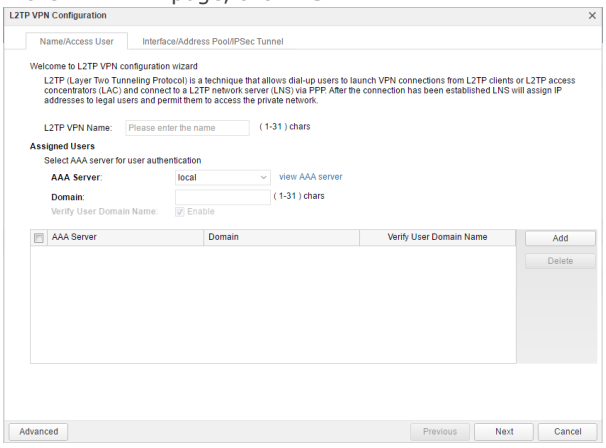
The device acts as a LNS in the L2TP tunnel network. The device accepts connections from L2TP clients or LACs, implements authentication and authorization, and assigns IP addresses, DNS server addresses and WINS server addresses to legal users.

L2TP does not encrypt the data transmitted through the tunnel, so it cannot assure security during the transmission. You can use L2TP in combination with IPsec, and encrypt data by IPSec, thus assuring the security during the data transmitted through the L2TP tunnel.

Configuring an L2TP VPN

To create an L2TP VPN instance, take the following steps:

1. Select **Network > VPN > L2TP VPN**.
2. In the L2TP VPN page, click **New**.



In the Name/Access User tab, configure the corresponding options.

Option	Description
L2TP VPN Name	Type the name of the L2TP VPN instance
Assigned Users	
AAA Server	Select an AAA server from the **AAA Server** drop-down list. You can click **View AAA Server** to view the detailed information of this AAA server.
Domain	Type the domain name into the **Domain** box. The domain name is used to distinguish the AAA server.
Verify User Domain Name	After this function is enable, system will verify the username and its domain name.
Add	Click **Add** to add the assigned users. You can repeat to add more items.

In the Interface/Address Pool/IPSec Tunnel tab, configure the corresponding options.

Access Interface	
Egress Interface	Select the interface from the drop-down list as the L2TP VPN server interface. This interface is used to listen to the request from L2TP clients.

Tunnel Interface	
Tunnel Interface	Specifies the tunnel interface used to bind to the L2TP VPN tunnel. Tunnel interface transmits traffic to/from L2TP VPN tunnel. • Select a tunnel interface from the drop-down list, and then click **Edit** to edit the selected tunnel interface. • Click **New** in the drop-down list to create a new interface.
Information	Shows the zone, IP address, and netmask of the selected tunnel interface.
Address Pool	
Address Pool	Specifies the L2TP VPN address pool. • Select an address pool from the drop-down list, and then click **Edit** to edit the selected address pool. • Click **New** in the drop-down list to create a new address pool. For more information about creating/editing address pools, see "Configuring an L2TP VPN Address Pool" on Page 198.
Information	Shows the start IP address, end IP address, and mask of the address pool.
L2TP over IPSec	
L2TP over IPSec	Select a referenced IPSec tunnel from the drop-down list. L2TP does not encrypt the data transmitted through the tunnel, so it cannot assure security during the transmission. You can use L2TP in combination with IPSec, and encrypt data by IPSec, thus assuring the security for the data transmitted through the L2TP tunnel..

3. If necessary, click **Advanced** to configure the advanced functions.

In the Parameters tab, configure the corresponding options.

Security	
Tunnel Authentication	Click **Enable** to enable tunnel authentication to assure the security of the connection. The tunnel authentication can be launched by either LNS or LAC. The tunnel cannot be established unless the both ends are authenticated, i.e., the secret strings of the two ends are consistent.
AVP Hidden	Click **Enable** to enable AVP hidden. L2TP uses AVP (attribute value pair) to transfer and negotiate several L2TP parameters and attributes. By default AVP is transferred in plain text. For data security consideration, you can encrypt the data by the secret string to hide the AVP during the transmission.
Secret	Specifies the secret string that is used for LNS tunnel authentication.
Peer	Specifies the host name of LAC. If multiple LACs are connected to LNS, you can specify different secret strings for different LACs by this parameter.
Add	Click **Add** to add the configured secret and peer name pair to the list.
Client Connection	
Accept Client IP	Click **Enable** to allow the accepting of IP address specified by the client. By default the client IP is selected from the address pool, and allocated by LNS automatically. If this function is enabled, you can specify an IP address. However, this IP address must belong to the specified address pool, and be consistent with the username and role. If the specified IP is already in use, system will not allow the user to log on.
Multiple Login	Click **Enable** to allow a user to log on and be authenticated on different hosts simultaneously.

Hello Interval	Specifies the interval at which Hello packets are sent. LNS sends Hello packets to the L2TP client or LAC regularly, and will drop the connection to the tunnel if no response is returned after the specified period.
LNS Name	Specifies the local name of LNS.
Tunnel Windows	Specifies the window size for the data transmitted through the tunnel.
Control Packet Transmit Retry	Specifies the retry times of control packets. If no response is received from the peer after the specified retry times, system will determine the tunnel connection is disconnected.
PPP Configuration	
LCP Interval Transmit Retry	Specifies parameters for LCP Echo packets used for PPP negotiation. The options are: • Interval: Specifies the interval at which LCP Echo packets are sent. • Transmit Retry: Specifies the retry times for sending LCP Echo packets. If LNS has not received any response after the specified retry times, it will determine the connection is disconnected.
PPP Authentication	Specifies a PPP authentication protocol. The options are: • PAP: Uses PAP for PPP authentication. • CHAP: Uses CHAP for PPP authentication. This is the default option. • Any: Uses CHAP for PPP authentication by default. If CHAP is not supported, then uses PAP.

4. Click **Done** to save the settings.

Configuring an L2TP VPN Address Pool

LNS assigns the IP addresses in the address pool to users. After the client has established a connection to LNS successfully, LNS will choose an IP address along with other related parameters (such as DNS server address, WINS server address, etc) from the address pool, and assign them to the client.

L2TP provides fixed IP addresses by creating and implementing IP binding rules.

- The static IP binding rule binds the client user to a fixed IP address in the address pool. Once the client has established a connection successfully, system will assign the binding IP to the client.
- The IP-role binding rule binds the role to a specific IP range in the address pool. Once the client has established a connection successfully, system will assign an IP address within the IP range to the client.

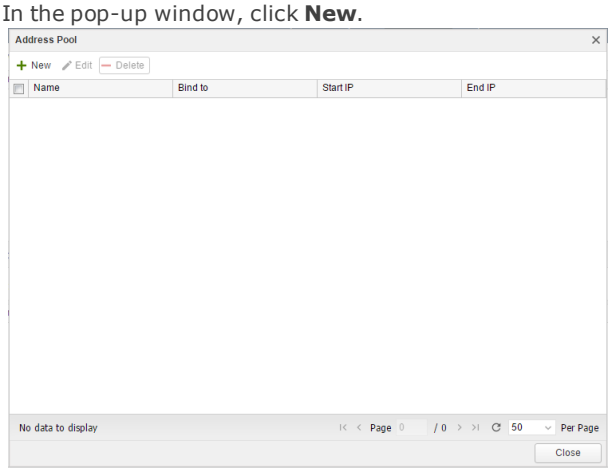
When LNS is allocating IP addresses in the address pool, system will check the IP binding rule and determine how to assign IP addresses for the client based on the specific checking order below:

Note: The IP addresses defined in the static IP binding rule and IP-role binding rule should not be overlapped.

To create an address pool, take the following steps:

1. Select **Network > VPN > L2TP VPN**.
2. At the top-right corner, click **Address Pool**.

3. In the pop-up window, click **New**.



In the Basic tab, configure the corresponding options.

Option	Description
Address Pool Name	Specifies the name of the address pool.
Start IP	Specifies the start IP of the address pool.
End IP	Specifies the end IP of the address pool.
Reserved Start IP	Specifies the reserved start IP of the address pool.
Reserved End IP	Specifies the reserved end IP of the address pool.
DNS1/2	Specifies the DNS server IP address for the address pool. It is optional. Up to 2 DNS servers can be configured for one address pool.
WINS1/2	Specifies the WIN server IP addresses for the address pool. It is optional. Up to 2 WIN servers can be configured for one address pool.

In the IP User Binding tab, configure the corresponding options.

Option	Description
User	Type the user name into the **User** box.
IP	Type the IP address into the **IP** box.
Add	Click **Add** to add this IP user binding rule.
Delete	To delete a rule, select the rule you want to delete from the list and click **Delete**.

In the IP Role Binding tab, configure the corresponding options.

Option	Description
Role	Type the role name into the **Role** box.
Start IP	Type the start IP address into the **Start IP** box.
End IP	Type the end IP address into the **End IP** box.
Add	Click **Add**to add this IP role binding rule.
Delete	To delete a rule, select the rule you want to delete from the list and click **Delete**.
Up/Down/Top/Bottom	System will query for IP role binding rules by turn, and allocate the IP address according to the first matched rule. You can move the location up or down at your own choice to adjust the matching sequence accordingly.

4. Click **OK** to save the settings.

Viewing L2TP VPN Online Users

To view the L2TP VPN online users, take the following steps:

1. Select **Network > VPN > L2TP VPN**.
2. Select an L2TP VPN instance.
3. View the detailed information of the online users in the table.

Option	Description
Name	Displays the name of L2TP VPN.
Login Time	Displays the login time of the L2TP VPN online user.
Public IP	Displays the public IP of the L2TP VPN online user.
Private IP	Displays the private IP of the L2TP VPN online user.
Operation	Displays the executable operation of the L2TP VPN online user.

Chapter 7 Object

This chapter describes the concept and configuration of objects that will be referenced by other modules in system, including:

- "Address" on Page 202: Contains address information, and can be used by multiple modules, such as policy rules, NAT rules, QoS, session limit rules, etc.
- "Host Book" on Page 204: A collection of one domain name or several domain names.
- "Service Book" on Page 205: Contains service information, and can be used by multiple modules, such as policy rules, NAT rules, QoS, etc.
- "Application Book" on Page 209: Contains application information, and it can be used by multiple modules, such as policy rules, NAT rules, QoS, etc.
- "SLB Server Pool " on Page 213: Describes SLB server configurations.
- "Schedule" on Page 215: Specifies a time range or period. The functions (such as policy rules, QoS rules, host blacklist, connections between the PPPoE interface and Internet) that use the schedule will take effect in the time range or period specified by the schedule.
- "AAA Server" on Page 217: Describes how to configure an AAA server.
- "User" on Page 227: Contains information about the functions and services provided by a Hillstone device, and users authenticated and managed by the device.
- "Role" on Page 232: Contains role information that associates users to privileges. In function configurations, different roles are assigned with different services. Therefore, the mapped users can gain the corresponding services as well.
- "Track Object" on Page 235: Tracks if the specified object (IP address or host) is reachable or if the specified interface is connected. This function is designed to track HA and interfaces.
- "URL Filter" on Page 237: URL filter controls the access to some certain websites and records log messages for the access actions.

Address

IP address is an important element for the configurations of multiple modules, such as policy rules, NAT rules and session limit rules. Therefore, system uses an address book to facilitate IP address reference and flexible configuration. You can specify a name for an IP range, and only the name is referenced during configuration. The address book is the database in system that is used to store the mappings between IP ranges and the corresponding names. The mapping entry between an IP address and its name in the address book is known as an address entry.

System provides a global address book. You need to specify an address entry for the global address book. When specifying the address entry, you can replace the IP range with a DNS name. Interfaces of the configured IPs will be used as address entries and added to the address book automatically. You can use them for NAT conveniently. Furthermore, an address entry also has the following features:

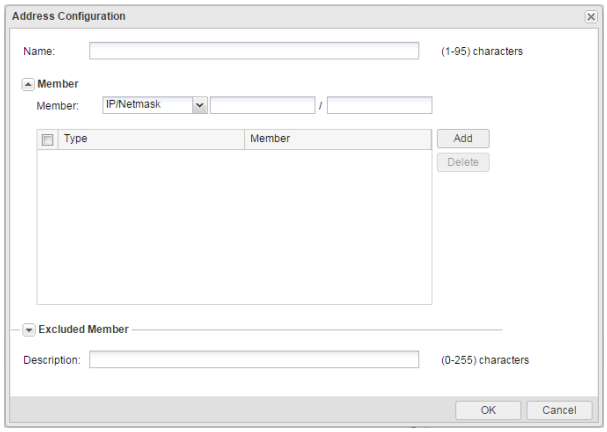
- All address books contain a default address entry named **Any** and **private_network**. The IP address of **Any** is 0.0.0.0/0, which is any IP address. **Any** can neither be edited nor deleted. The IP addresses of **private_network** are 10.0.0.0/8, 172.16.0.0/12, 192.168.0.0/16, that all private network address. The **private_network** can be edited and deleted.
- One address entry can contain another address entry in the address book.
- If the IP range of an address entry changes, StoneOS will update other modules that reference the address entry automatically.

Address book supports IPv4 and IPv6 address. If IPv6 is enabled, you can configure IPv6 address entry.

Creating an Address Book

To create an address book, take the following steps:

1. Click **Object>Address Entry**.
2. Click **New**.



In Address Configuration dialog box, enter the address entry configuration.

Basic	
Name	Type the address entry name into the Name box.
Type	Select the IP type, including IPv4 or IPv6. Only the IPv6 firmware supports to configure IPv6 type IP. If IPv6 is selected, all the IP/netmask, IP range, address entry configured should be in the IPv6 format.
Member	
Member	Select an address entry member from the drop-down list, and configure IP/netmask, IP range, Host name， Address entry， or Country/Region as needed.

Basic	
	• The Country/Region member is supported in the address entry of the IPv4 type. • Only the security policy and the policy-based route support the address entry with the Country/Region member added. • The address entry with the Country/Region member added does not support the **Excluded Member** settings.
Add	Click Add to add the configured member to the list below. If it is needed, repeat the above steps to add more members.
Delete	Delete the selected address entry from the list.
Excluded Member	
Member	Specify the excluded member. Select an address entry member from the drop-down list, and configure IP/netmask, IP range, Host name or Address entry as needed. **Note**: Excluded members' address range need to be in the address range of the members, otherwise the configuration cannot be completed.
Add	Click Add to add the configured excluded member to the list below. If needed, repeat the above steps to add more excluded members.
Delete	Delete the selected excluded member entry from the list.

3. Click OK.

Viewing Details

To view the details of an address entry, take the following steps, including the name, member, description and reference:

1. Click **Object>Address Entry**.
2. In the Address Book dialog box, select an address entry from the member list, and view the details under the list.

Host Book

You can specify a name to be a collection of one domain name or several domain names, and reference this host book when configuring. Host book is the database to store the relationships of domain integrations and the specified names in system.

The entry of the relationship of domain integrations and the specified name is called host entry.

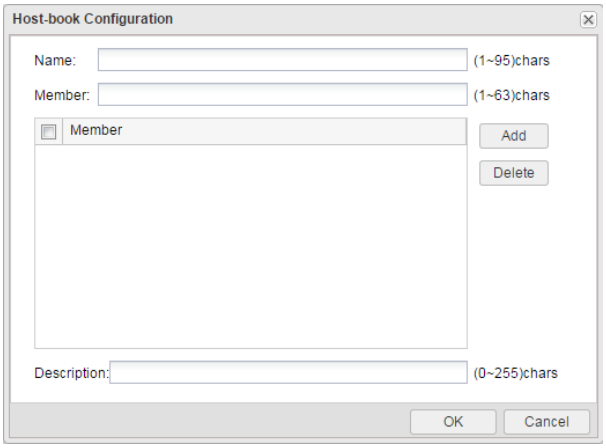
Note:

- The maximum number of host entries is one fourth of the maximum number of address entries.
- Up to one host entry can be configured for each PBR rule.

Creating a Host Book

To create a host book, take the following steps:

1. Select **Object > Host Book**.
2. Click **New**.



Configure the following options.

Option	Description
Name	Type a name for the host book.
Member	Specifies the host entry member. Enter IP address or domain name in the Member text box and then click **Add**. If needed, you can add multiple host entries in the host book. Select the host entry you want to delete and click **Delete**, then the selected entry will be removed.
Description	Type the description of host book.

3. Click **OK**.

Service Book

Service is an information stream designed with protocol standards. Service has some specific distinguishing features, like corresponding protocol, port number, etc. For example, the FTP service uses TCP protocol, and its port number is 21. Service is an essential element for the configuration of multiple StoneOS modules including policy rules, NAT rules, QoS rules, etc.

System ships with multiple predefined services/service groups. Besides, you can also customize user-defined services/service groups as needed. All these service/service groups are stored in and managed by StoneOS service book.

Predefined Service/Service Group

System ships with multiple predefined services, and identifies the corresponding application types based on the service ports. The supported predefined services may vary from different Hillstone device models. Predefined service groups contain related predefined services to facilitate user configuration.

User-defined Service

Except for the above predefined services, you can also create your own user-defined services easily. The parameters that will be specified for the user-defined service entries include:

- Name
- Protocol type
- The source and destination port for TCP or UDP service, and the type and code value for ICMP service.

User-defined Service Group

You can organize some services together to form a service group, and apply the service group to StoneOS policies directly to facilitate management. The service group has the following features:

- Each service of the service book can be used by one or more service groups.
- A service group can contain both predefined services and user-defined services.
- A service group can contain another service group. The service group of StoneOS supports up to 8 layers of nests.

The service group also has the following limitations:

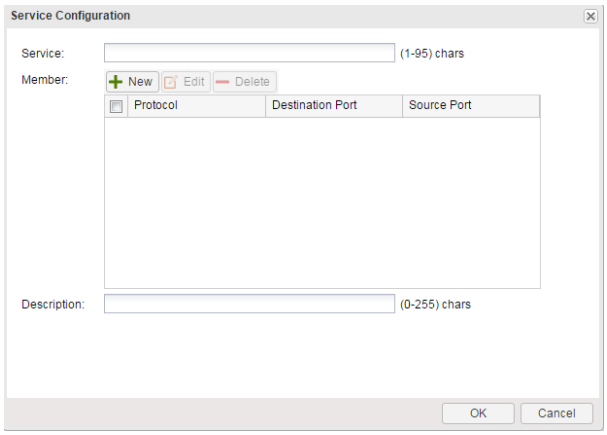
- The name of a service and service group should not be identical.
- A service group being used by any policy cannot be deleted. To delete such a service group, you must first end its relationship with the other modules.
- If a user-defined service is deleted from a service group, the service will also be deleted from all of the service groups using it.

Configuring a Service Book

This section describes how to configure a user-defined service and service group.

Configuring a User-defined Service

1. Select **Object > Service Book > Service**.
2. Click **New**.



Configure the following options.

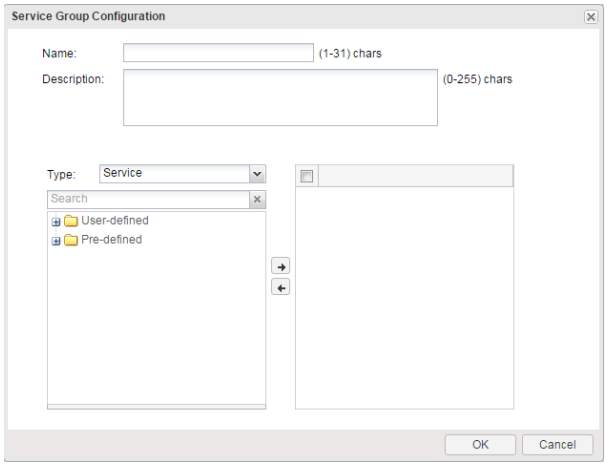
Service Configuration	
Service	Type the name for the user-defined service into the textbox.
Member	Specify a protocol type for the user-defined service. The available options include TCP, UDP, ICMP and Others. If needed, you can add multiple service items. Click **New** and the parameters for the protocol types are described as follows:
TCP/UDP	Destination port: • Min - Specifies the minimum port number of the specified service entry. • Max - Specifies the maximum port number of the specified service entry. The value range is 0 to 65535. Source port: • Min - Specifies the minimum port number of the specified service entry. • Max - Specifies the maximum port number of the specified service entry. The value range is 0 to 65535. **Note:** The minimum port number cannot exceed the maximum port number.
ICMP	Type: Specifies an ICMP type for the service entry. The value range is 3 (Destination-Unreachable), 4 (Source

Service Configuration		
		Quench), 5 (Redirect), 8 (Echo), 11 (Time Exceeded), 12 (Parameter Problem), 13 (Timestamp) and 15 (Information). Min Code: Specifies a minimum value for ICMP code. The value range is 0 to 5. Max Code: Specifies a maximum value for ICMP code. The value range is 0 to 5. **Note:** The minimum port number cannot exceed the maximum port number.
	Others	Protocol: Specifies a protocol number for the service entry. The value range is 1 to 255.
Description	If it's needed, type the description for the service into the text box.	

3. Click **OK**.

Configuring a User-defined Service Group

1. Select **Object > Service Book > Service Group**.
2. Click **New**.



Configure the following options.

Service Group Configuration	
Name	Type the name for the user-defined service group into the text box.
Description	If needed, type the description for the service into the text box.
Member	Add services or service groups to the service group. System supports at most 8-layer nested service group. Expand Pre-defined Service or User-defined Service from the left pane, select services or service groups, and then click **Add** to add them to the right pane. To remove a selected service, select it from the right pane,

Service Group Configuration	
	and then click **Remove**.

3. Click **OK**.

Viewing Details

To view the details of a service entry, take the following steps, including the name, protocol, destination port and reference:

1. Click **Object>Service Book > Service**.
2. In the service dialog box, select an address entry from the member list, and view the details under the list.

Application Book

Application has some specific features, like corresponding protocol, port number, application type, etc. Application is an essential element for the configuration of multiple device modules including policy rules, NAT rules, application QoS management, etc.

System ships with multiple predefined applications and predefined application groups. Besides, you can also customize user-defined application and application groups as needed. All of these applications and applications groups are stored in and managed by StoneOS application book.

If IPv6 is enabled, IPv6 applications will be recognized by StoneOS.

Editing a Predefined Application

You can view and use all the supported predefined applications and edit TCP timeout, but cannot delete any of them. To edit a predefined application, take the following steps:

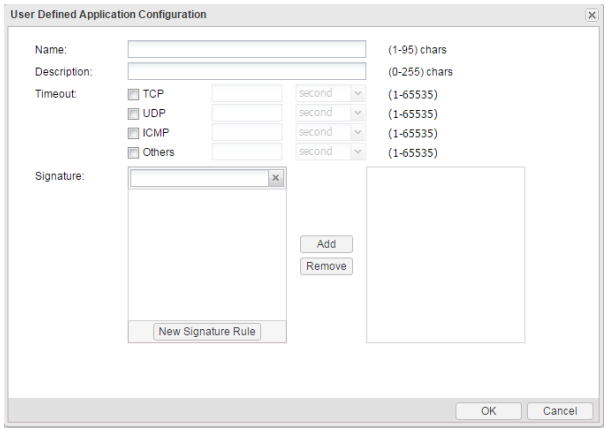
1. Select **Object > APP Book > Application**.
2. Select the application you want to edit from the application list, and click **Edit**.
3. In the Application Configuration dialog box, edit TCP timeout for the application.

Creating a User-defined Application

You can create your own user-defined applications. By configuring the customized application signature rules, system can identify and manage the traffic that crosses into the device, thus identifying the type of the traffic.

To create a user-defined application, take the following steps:

1. Select **Object > APP Book > Application**.
2. Click **New**.



Configure the following options.

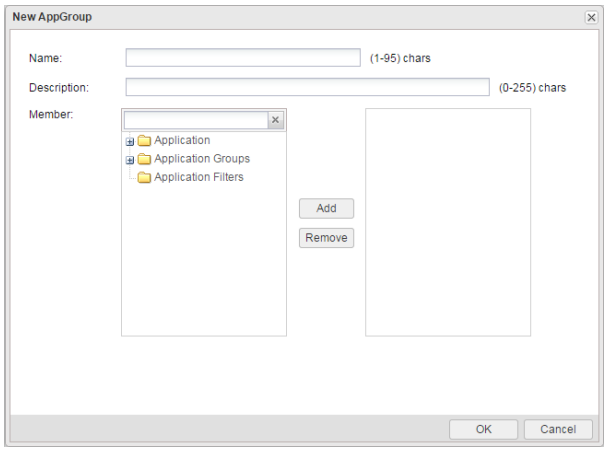
Option	Description
Name	Specify the name of the user-defined application.
Description	Specify the description of the user-defined application.
Timeout	Configure the application timeout value. If not, system will use the default value of the protocol.
Signature	Select the signature of the application and then click **Add**. To create a new signature, see "Creating a Signature Rule" on Page 210.

3. Click **OK**.

Creating a User-defined Application Group

To create a user-defined application group, take the following steps:

1. Select **Object > APP Book > Application Groups**
2. Click **New**.



Configure the following options.

Option	Description
Name	Specifies a name for the new application group.
Description	Specifies the description for the application group.
Member	Add applications or application groups to the application group. System supports at most 8-layer nested application group. Expand Application or Application Group from the left pane, select applications or application groups, and then click **Add** to add them to the right pane. To remove a selected application or application group, select it from the right pane, and then click **Remove**.

3. Click **OK**.

Creating an Application Filter Group

Application Filter Group allows you to create a group to filter applications according to application category, sub-category, technology, risk, and attributes.

To create an application filter group, take the following steps:

1. Select **Object > APP Book > Application Filters**.
2. Click **New**.
3. Type an application filter group name in the Name text box.
4. Specifies the filter condition. Choose the category, subcategory, technology, risk and characteristic by sequence in the drop-down list. You can click Clear Filter to clear all the selected filter conditions according to your need.
5. Click **OK**.

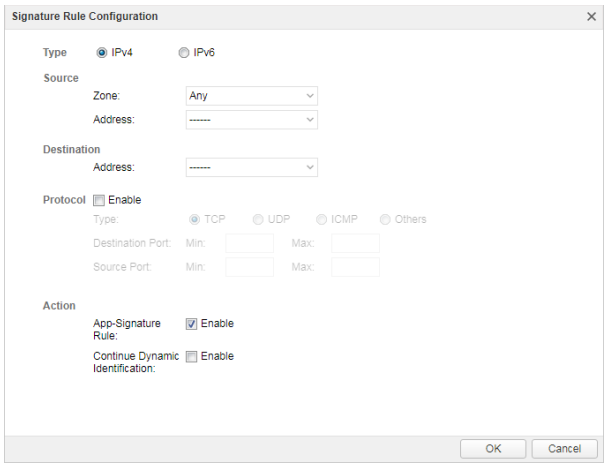
Creating a Signature Rule

By configuring the customized application signature rules, system can identify and manage the traffic that crosses into the device. When the traffic matches all of the conditions defined in the signature rule, it hits this signature rule. Then system identifies the application type.

If IPv6 is enabled, traffic of IPv6 address will be recognized by StoneOS.

To create a new signature rule, take the following steps:

1. Select **Object > APP Book > Signature Rule**.
2. Click **New**.



Configure the following options.

Option	Description
Type	Specify the IP address type, including IPv4 and IPv6 address. If IPv6 is enabled, traffic of IPv6 address will be recognized by StoneOS.
Source	
Zone	Specify the source security zone of the signature rule.
Address	Specify the source address. You can use the Address Book type or the IP/Netmask type.
Destination	
Address	Specify the source address. You can use the Address Book type or the IP/Netmask type.
Protocol	
Enable	Select the **Enable** check box to configure the protocol of the signature rule.
Type	When selecting **TCP** or **UDP**, • Destination Port: Specify the destination port number of the user-defined application signature. If the destination port number is within a range, system will identify the value of min-port as the minimum port number and identify the value of max-port as the maximum port number. The range of destination port number is 0 to 66535. The port number cannot be 0. For example, the destination port number is in the range of 0 to 20, but it cannot be 0. • Source Port: Specify the source port number of the user-defined application signature. If the source port number is within a range, system will identify the value of min-port as the minimum port number and identify the value of max-port as the maximum port number. The range of source port number is 0 to 66535. When selecting **ICMP**:

Option	Description
	• Type: Specify the value of the ICMP type of the application signature. The options are as follows: 3 (Destination-Unreachable), 4 (Source Quench)， 5 (Redirect), 8 (Echo), 11 (Time Exceeded), 12 (Parameter Problem), 13 (Timestamp), 15 (Information), and any (any represents all of the above values). • Min Code: Specify the value of the ICMP code of the application signature. The ICMP code is in the range of 0 to 5. The default value is 0-5. When selecting **Others**: • Protocol: Specifies the protocol number of the application signature. The protocol number is in the range of 1 to 255.
Action	
App-Signature Rule	Select **Enable** to make this signature rule take effect after the configurations. Otherwise, it will not take effect.
Continue Dynamic Identification	Without selecting this check box, if the traffic satisfies the user-defined signature rule and system has identified the application type, system will not continue identifying the application. To be more accurate, you can select this check box to set the system to continue dynamically identification.

3. Click **OK**.

Viewing Details

To view the details of an application entry, including the name, category, risk and reference, take the following steps:

1. Click **Object>APP Book > Application**.
2. In the application dialog box, select an address entry from the member list, and view the details under the list.

SLB Server Pool

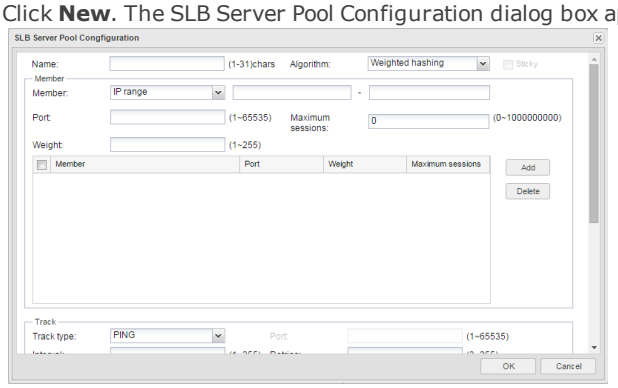
The SLB function uses the load balancing algorithm to distribute the traffic and this utilizes the resources of the intranet servers. You can use the following methods to balance the server load:

- Distribute the traffic to the specified port of each intranet server. This is applicable to the scenario that different intranet servers provide the same service via specified port at the same time.
- Distribute the traffic to different ports of an intranet server. This is applicable to the scenario that an intranet server provides the same service by running the same process at different ports.
- Combine the above two methods.

Configuring SLB Server Pool and Track Rule

To configure an SLB server pool and track rule, take the following steps:

1. Select **Object > SLB Server Pool**.
2. Click **New**. The SLB Server Pool Configuration dialog box appears.



In the SLB Server Pool Configuration dialog box, configure the following options.

Option	Description
Name	Specifies the name of the SLB server pool
Algorithm	Select an algorithm for load balancing.
Member	
Member	Specifies the member of the pool. You can type the IP range or the IP address and the netmask.
Port	Specifies the port number of the server.
Maximum Sessions	Specifies the allowed maximum sessions of the server. The value ranges from 0 to 1,000,000,000. The default value is 0, which represents no limitation.
Weight	Specifies the traffic forwarding weight during the load balancing. The value ranges from 1 to 255.
Add	Add the SLB address pool member to the SLB server pool. You can add up to 256 members.
Track	
Track Type	Selects a track type.
Port	Specifies the port number that will be tracked. The value ranges from 0 to 65535. • When the members in the SLB server pool have the same IP address and different ports, you don't need to specify the port

Option	Description
	when configuring the track rule. System will track each IP address and its port in the SLB server pool. • When there is a member whose port is not configured exists in the SLB sever pool, you must specify the port when configuring the track rule. System will track the specified port of the IP addresses in the SLB server pool. • When the members in the SLB server pool are all configured with IP addresses and ports and these configured IP addresses are different from each other, you can select whether to specify the port when configuring the track rule. If specified, system will track the specified port of these IP addresses. If not, system will track the configured ports of the IP addresses of the members.
Interval	Specifies the interval between each Ping/TCP/UDP packet. The unit is second. The value ranges from 3 to 255.
Retries	Specifies a retry threshold. If no response packet is received after the specified times of retries, System will determine this track entry fails, i.e., the track entry is unreachable. The value range is 1 to 255.
Weight	Specifies a weight for the overall failure of the whole track rule if this track entry fails. The value range is 1 to 255.
Add	Click **Add** to add the configured track rule to the list.
Threshold	Types the threshold for the track rule into the **Threshold** box. The value range is 1 to 255. If the sum of weights for failed entries in the track rule exceeds the threshold, system will conclude that the track rule fails.
Description	Types the description for this track rule.

3. Click **OK** to save the settings.

Viewing Details of SLB Pool Entries

To view the details of the servers in the SLB pool, take the following steps:

1. Click **Object > SLB Server Pool**.
2. Select an SLB pool entry.
3. In the Server List tab at the bottom of this page, view the information of the servers that are in this SLB pool.
4. In the Monitoring tab, view the information of the track rules.
5. In the Referenced tab, view the DNAT rules that use the SLB pool.

Schedule

System supports a schedule. This function allows a policy rule to take effect in a specified time and controls the duration of the connection between a PPPoE interface and the Internet. The schedule consists of a periodic schedule and an absolute schedule. The periodic schedule specifies a time point or time range for periodic schedule entries, while the absolute schedule decides a time range in which the periodic schedule will take effect.

Periodic Schedule

Periodic schedule is the collection of periods specified by all of the schedule entries within the schedule. You can add up to 16 schedule entries to a periodic schedule. These entries can be divided into 3 types:

- Daily: The specified time of every day, such as Everyday 09:00 to 18:00.
- Days: The specified time of a specified day during a week, such as Monday Tuesday Saturday 09:00 to 13:30.
- Period: A continuous period during a week, such as from Monday 09:30 to Wednesday 15:00.

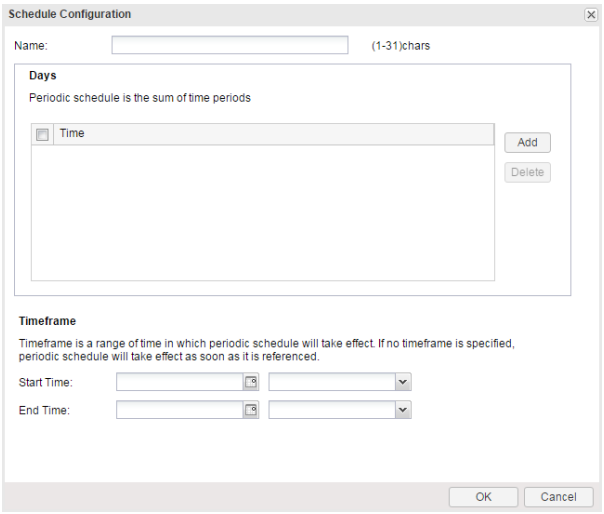
Absolute Schedule

An absolute schedule is a time range in which a periodic schedule will take effect. If no absolute schedule is specified, the periodic schedule will take effect as soon as it is used by some module.

Creating a Schedule

To create a schedule, take the following steps:

1. Select **Object > Schedule**.
2. Click **New**.



Configure the following options.

Schedule Configuration Dialog Box	
Name	Specifies a name for the new schedule.
Add	Specifies a type for the periodic schedule in Add Periodic Schedules section.
Type	• Daily - The specified time of every day. Click this radio button, and then, in the Time section, select a start time and end time from the Start time and End time drop-down list respectively.

Schedule Configuration Dialog Box		
		• Days - The specified time of a specified day during a week. Click this radio button, and then select a day/days in the Days and Time section, and finally select a start time and end time from the Start time and End time drop-down list respectively. • Period - A continuous period during a week. Click this radio button, and then in the Duration section select a start day/time and end day/time from the Start time and End time drop-down list respectively.
	Preview	Preview the detail of the configured periodic schedule in the Preview section.
Delete	Select the entry you want to delete from the period schedule list below, and click **Delete**.	
Absolute Schedule	The absolute schedule decides a time range in which the periodic schedule will take effect. Without configuring an absolute schedule, the periodic schedule will take effect as soon as it is used by some module.	

3. Click **OK**.

AAA Server

An AAA server is a server program that handles user requests to access computer resources, and for an enterprise, this server provides authentication, authorization, and accounting (AAA) services. The AAA server typically interacts with network access and gateway servers and with databases and directories containing user information.

Here in StoneOS system, authentication supports the following five types of AAA server:

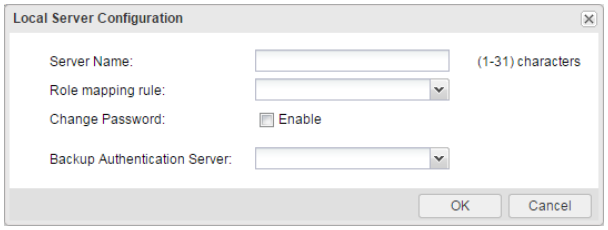
- Local server: a local server is the firewall itself. The firewall stores user identity information and handles requests. A local server authentication is fast and cheap, but its storage space is limited by the firewall hardware size.
- External servers:
  - Radius Server
  - LDAP Server
  - Active-Directory Server
  - TACACS+ Server

According to the type of authentication, you need to choose different AAA servers:

- "Single Sign-On" on Page 96: Only an AD server supports SSO.
- "802.1x" on Page 109 and "Configuring IPSec-XAUTH Address Pool" on Page 135: Only local and Radius servers support these two types of authentication.
- Other authentication methods mentioned in this guide: all four servers can support the other authentication methods.

Configuring a Local AAA Server

1. Select **Object > AAA Server**, and click **New > Local Server**.
2. The Local Server dialog box opens.



In the prompt, configure the following.

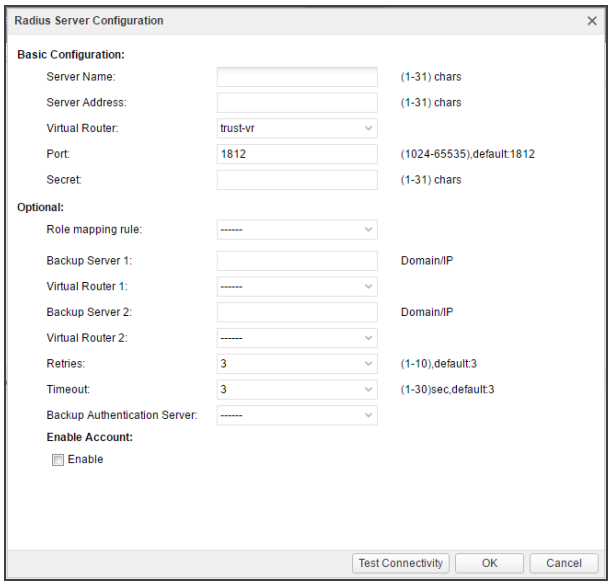
Option	Description
Server Name	Type the name for the new server into the text box.
Role Mapping Rule	Specifies a role mapping rule for the server. With this option selected, system will allocate a role for the users who have been authenticated to the server according to the specified role mapping rule.
Change Password	If needed, select the Enable checkbox. With this function enabled, system allows users to change their own passwords after the successful WebAuth or SCVPN authentication.
Backup Authentication Server	To configure a backup authentication server, select a server from the drop-down list. After configuring a backup authentication server for the local server, the backup authentication server will take over the authentication task when the primary server malfunctions or authentication fails

Option	Description
	on the primary server. The backup authentication server can be any existing local, Active-Directory, RADIUS or LDAP server defined in system.

3. Click **OK**.

Configuring Radius Server

1. Select **Object > AAA Server**, and select **New > Radius Server**.
2. The Radius Sever dialog box opens.



In the prompt, configure the following.

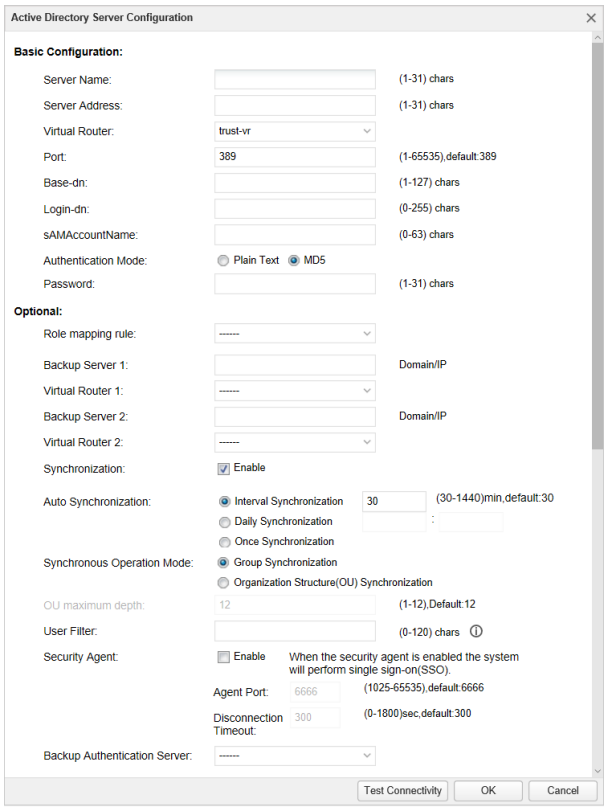
Basic Configuration	
Server Name	Specifies a name for the Radius server.
Server Address	Specifies an IP address or domain name for the Radius server.
Virtual Router	Specifies a VR for the Radius server.
Port	Specifies a port number for the Radius server. The value range is 1024 to 65535. The default value is 1812.
Password	Specifies a password for the Radius server. You can specify at most 31 characters.
Optional	
Role Mapping Rule	Specifies a role mapping rule for the server. With this option selected, system will allocate a role for the users who have been authenticated to the server according to the specified role mapping rule.
Backup server 1/Backup server 2	Specifies an IP address or domain name for backup server 1 or backup server 2.
Virtual Router-1/Virtual Router2	Specifies a VR for the backup server.
Retries	Specifies a retry time for the authentication packets sent to the AAA server. The value range is 1 to 10. The default value is 3.
Timeout	Specifies a timeout for the server response. The value range is 1 to 30 seconds. The default value is 3.
Backup Auth Server	Specifies a backup authentication server. After configuring a backup authentication server for the Radius server, the backup authentication server will take over the authentication task when the primary server malfunctions or authentication fails on the primary server. The backup authentication server can be any existing local, Active-Directory, RADIUS or LDAP server defined in system.
Enable Account	Select the **Enable Account** checkbox to enable accounting for the Radius server, and then configure options in the sliding out area.

Server Address	Specifies an IP address or domain name for the accounting server.
Virtual Router	Specifies a VR for the accounting server.
Port	Specifies a port number for the accounting server. The value range is 1024 to 65535. The default value is 1813.
Password	Specifies a password for the accounting server.
Confirm Password	Enter the password again to confirm.
Backup server 1/Backup server 2	Specifies an IP address or domain name for backup server 1 or backup server 2.
Virtual Router1/Virtual Router2	Specifies a VR for the backup server.

3. Click **OK**.

Configuring Active Directory Server

1. Select **Object > AAA Server**, and then select **New > Active Directory Server**.
2. The Active Directory Server dialog box opens.



In the prompt, configure the following.

Basic Configuration	
Server Name	Specifies a name for the Active Directory server.
Server Address	Specifies an IP address or domain name for the Active Directory server.
Virtual Router	Specifies a VR for the Active Directory server.
Port	Specifies a port number for the Active Directory server. The value range is 1 to 65535. The default value is 389.
Base-dn	Specifies a Base-dn for the AD server. The Base-dn is the starting point at which your search will begin when the AD server receives an authentication request. For the example of abc.xyz.com as described above, the format for the Base-dn is "dc=abc,dc=xyz,dc=com".
Login-dn	Specifies authentication characteristics for the Login-dn (typically a user account with query privilege pre-defined by the AD server). When the authentication mode is plain, the Login-dn should be configured. DN (Distinguished name) is a username of the AD server who has a privilege to read user information. The format of the DN is"cn=xxx, DC=xxx,...". For example, the server domain is abc.xyz.com, and the AD server admin name is administrator who

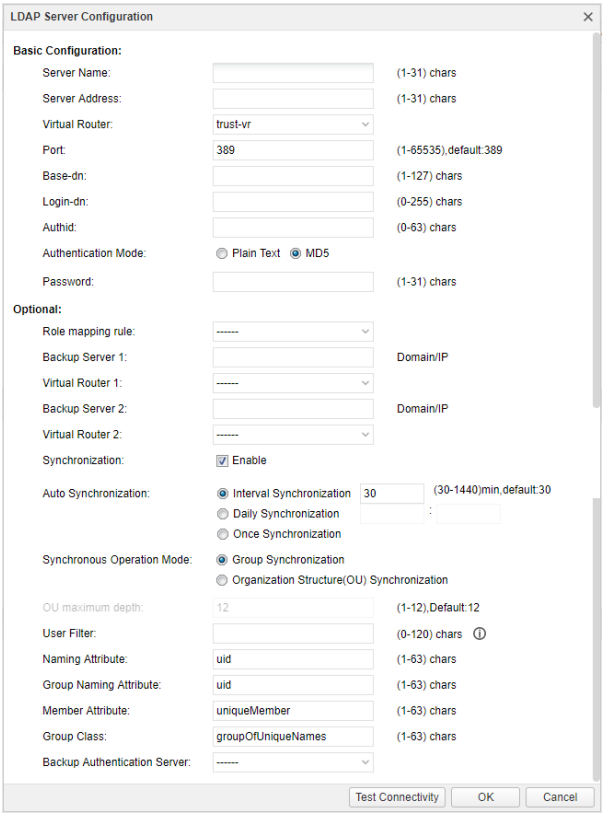
Basic Configuration	
	locates in Users directory. Then the login-dn should be "cn=a-administrator,cn=users,dc=abc,dc=xyz,dc=com".
sAMAccountName	When the authentication mode is MD5, the sAMAccountName should be configured. sAMAccountName is a username of the AD server who has a privilege to read user information. The format of sAMAccountName is "xxx". For example, the AD server admin name is administrator , and then the sAMAccountName should be "administrator".
Authentication Mode	Specifies an authentication or synchronization method (either plain text or MD5). The default method is MD5. If the sAMAccountName is not configured after you specify the MD5 method, the plain method will be used in the process of synchronizing user from the server, and the MD5 method will be used in the process of authenticating the user.
Password	Specifies a password for the AD server.
Optional	
Role Mapping Rule	Specifies a role mapping rule for the server. With this option selected, system will allocate a role for users who have been authenticated to the server according to the specified role mapping rule.
Backup server 1/Backup server 2	Specifies an IP address or domain name for backup server 1 or backup server 2.
Virtual Router1/Virtual Router2	Specifies a VR for the backup server.
Synchronization	Check the checkbox to enable the synchronization function; clear the checkbox to disable the synchronization function, and the system will stop synchronizing and clear the existing user information. By default, system will synchronize the user information on the configured Active-Directory server with the local server every 30 minutes.
Automatic Synchronization	Click the radio button to specify the automatic synchronization. Interval Synchronization: Specifies the time interval for automatic synchronization. The value range is 30 to 1440 minutes. The default value is 30. Daily Synchronization: Specifies the time when the user information is synchronized everyday. The format is HH:MM, HH and MM indicates hour and minute respectively. Once Synchronization: If this parameter is specified, system will synchronize automatically when the configuration of Active-Directory server is modified. After executing this command , system will synchronize the user information immediately.
Synchronous Oper-	Specifies user synchronization mode, including Group Syn-

Basic Configuration	
ation Mode	chronization and OU Synchronization. By default, the user information will be synchronized with the local server based on the group.
OU maximum depth	Specifies the maximum depth of OU to be synchronized. The value range is 1 to 12, and the default value is 12. OU structure that exceeds the maximum depth will not be synchronized, but users that exceed the maximum depth will be synchronized to the specified deepest OU where they belong to. If the total characters of the OU name for each level(including the "OU=" string and punctuation) is more than 128, OU information that exceeds the length will not be synchronized with the local server.
User Filter	Specifies the user-filter conditions. System can only synchronize and authenticate users that are in accordance with the filtering condition on the authentication server. The length is 0 to 120 characters. For example, if the condition is configured to "memberOf=CN=Admin,DC=test,DC=com", system only can synchronize or authenticate user whose DN is "memberOf=CN=Admin,DC=test,DC=com". The commonly used operators are: =(equals a value)、&(and)、|(or)、!(not)、*(Wildcard: when matching zero or more characters)、~=(fuzzy query.)、>=Be greater than or equal to a specified value in lexicographical order.)、<=(Be less than or equal to a specified value in lexicographical order.).
Security Agent	Select the **Enable** check box to enable the Security Agent. With this function enabled, system will be able to obtain the mappings between the usernames of the domain users and IP addresses from the AD server, so that the domain users can gain access to network resources. In this way "Single Sign-On" on Page 96 is implemented. Besides, by making use of the obtained mappings, system can also implement other user-based functions, like security statistics, logging, behavior auditing, etc. To enable the Security Agent on the AD server, you first need to install and run the Security Agent on the server. Afterwards, when a domain user is logging in or logging off, the Security Agent will log the user's username, IP address, current time, and other information, and it will add the mapping between the username and the IP address to system. In this way the system can obtain every online user's IP address.
Agent Port	Specify the monitoring port. StoneOS communicates with the AD Agent through this port. The range is 1025 to 65535. The default value is 6666. This port must be matched with the configured port of AD Agent, or system will fail to communicate with the AD Agent.
Disconnection Timeout	Specifies the disconnection timeout. The value range is 0 to 1800 seconds. The default value is 300. The value of 0 indicates never timeout.
Backup Authentication Server	Specifies a backup authentication server. After configuring a backup authentication server for the Radius server, the backup authentication server will take over the authentication task when the primary server malfunctions or authentication fails on the primary server. The backup authentication server can be any existing local, Active-Directory, RADIUS or LDAP server defined in system.

3. Click **OK**.

Configuring LDAP Server

1. Select **Object > AAA Server**, and then select **New > LDAP Server**.
2. The LDAP Server dialog box opens.



In the prompt, configure the following.

Basic Configuration	
Server Name	Specifies a name for the LDAP server.
Server Address	Specifies an IP address or domain name for the LDAP server.
Virtual Router	Specifies a VR for the LDAP server.
Port	Specifies a port number for the LDAP server. The value range is 1 to 65535. The default value is 389.
Base-dn	Specifies the details for the Base-dn. The Base-dn is the starting point at which your search will begin when the LDAP server receives an authentication request.
Login-dn	Specifies authentication characteristics for the Login-dn (typically a user account with query privileges pre-defined by the LDAP server).
Authid	Specifies the Authid, which is a string of 1 to 63 characters and is case sensitive.
Authentication Mode	Specifies an authentication or synchronization method (either plain text or MD5). The default method is MD5. If the Authid is not configured after you specify the MD5 method, the plain method will be used in the process of synchronizing user from the server, and the MD5 method will be used in the process of authenticating

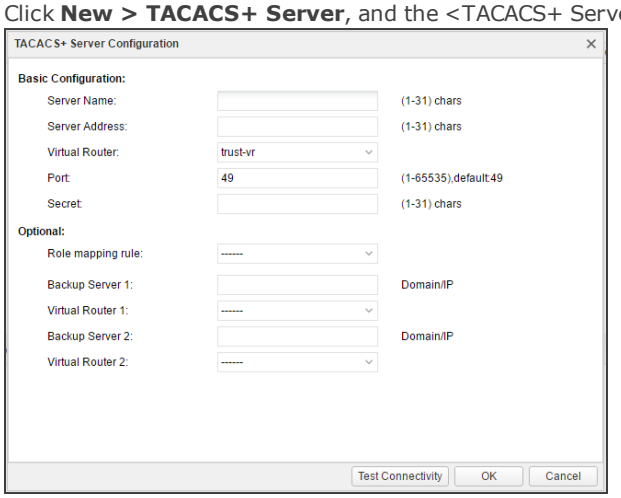
Basic Configuration	
	user.
Password	Specifies a password for the LDAP server. This should correspond to the password for Admin DN.
Optional	
Role Mapping Rule	Specifies a role mapping rule for the server. With this option selected, system will allocate a role for the users who have been authenticated to the server according to the specified role mapping rule.
Backup server 1/Backup server 2	Specifies an IP address or domain name for backup server 1 or backup server 2.
Virtual Router-1/Virtual Router2	Specifies a VR for the backup server.
Synchronization	Check the checkbox to enable the synchronization function; clear the checkbox to disable the synchronization function, and system will stop synchronizing and clear the existing user information. By default, system will synchronize the user information on the configured LDAP server with the local every 30 minutes.
Automatic Synchronization	Click the radio button to specify the automatic synchronization. Interval Synchronization: Specifies the time interval for automatic synchronization. The value range is 30 to 1440 minutes. The default value is 30. Daily Synchronization: Specifies the time when the user information is synchronized everyday. The format is HH:MM, HH and MM indicates hour and minute respectively. Once Synchronization: If this parameter is specified, system will synchronize automatically when the configuration of LDAP server is modified. After executing this command , system will synchronize user information immediately.
Synchronous Operation Mode	Specifies the user synchronization mode, including Group Synchronization and OU Synchronization. By default, the user information will be synchronized with the local server based on the group.
OU maximum depth	Specifies the maximum depth of OU to be synchronized. The value range is 1 to 12, and the default value is 12. OU structure that exceeds the maximum depth will not be synchronized, but users that exceed the maximum depth will be synchronized to the specified deepest OU where they belong to. If the total characters of the OU name for each level(including the "OU=" string and punctuation) is more than 128, OU information that exceeds the length will not be synchronized with the local server.
User Filter	Specifies the user filters. System can only synchronize and authenticate users that match the filters on the authentication server. The length is 0 to 120 characters. For example, if the condition is configured to "(|(objectclass=inetOrgperson)(objectclass=person))", system only can synchronize or authenticate users which are defined as inetOrgperson or

Basic Configuration	
	person. The commonly used operators are as follows: =(equals a value)、&(and) 、|(or)、!(not)、*(Wildcard: when matching zero or more characters)、 ~ =(fuzzy query.)、 >=(Be greater than or equal to a specified value in lexicographical order.)、 <=(Be less than or equal to a specified value in lexicographical order.).
Naming Attribute	Specifies a naming attribute for the LDAP server. The default naming attribute is uid.
Group Naming Attribute	Specifies a naming attribute of group for the LDAP server. The default naming attribute is uid.
Member Attribute	Specifies a member attribute for the LDAP server. The default member attribute is uniqueMember.
Group Class	Specifies a group class for the LDAP server. The default class is groupofuniquenames.
Backup Authentication Server	Specifies a backup authentication server. After configuring a backup authentication server for the LDAP server, the backup authentication server will take over the authentication task when the primary server malfunctions or authentication fails on the primary server. The backup authentication server can be any existing local, Active-Directory, RADIUS or LDAP server defined in system.

3. Click **OK**.

Configuring TACACS+ Server

1. Select **Object > AAA Server**.
2. Click **New > TACACS+ Server**, and the <TACACS+ Server Configuration> dialog box will appear.



Configure values in the <TACACS+ Server Configuration> dialog box.

Basic Configuration	
Server Name	Enter a name for the TACACS+ server.
Server Address	Specify the IP address or host name for the TACACS+ server.
Virtual Router	Specify the VRouter of TACACS+ server.
Port	Enter port number for the TACACS+ server. The default value is 49. The value range is 1 to 65535.
Secret	Enter the shared secret to connect the TACACS+ server.

Basic Configuration	
Confirm Secret	Re-enter the shared key.
Optional	
Role mapping rule	Select a role mapping rule for the server. With this option selected, system will allocate a role for the users who have been authenticated to the server according to the specified role mapping rule.
Backup Server 1 (2)	Enter the domain name or IP address for the backup TACACS+ server.
Virtual Router 1 (2)	Select the VRouter for the backup server.

Connectivity Test

When AAA server parameters are configured, you can test if they are correct by testing server connectivity.

To test server connectivity, take the following steps:

1. Select **Object > AAA Server**, and click **New**.
2. Select your AAA server type, which can be Radius, AD, LDAP or TACACS+. The local server does not need the connectivity test.
3. After filling out the fields, click **Test Connectivity**.
4. For Radius or TACACS+ server, enter a username and password in the popped <Test Connectivity> dialog box. If the server is AD or LDAP, the login-dn and secret is used to test connectivity.

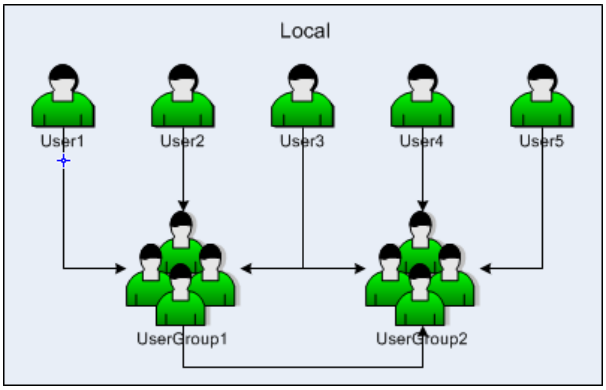
5. Click **Test Connectivity**. If "Test connectivity success" message appears, the AAA server settings are correct.

If there is an error message, here are the causes:

- Connect AAA server timeout: Wrong server address, port or virtual router.
- AAA server configuration error: Secret is wrong.
- Wrong name or password: Username or password for testing is wrong.

User

User refers to the user who uses the functions and services provided by the Hillstone device, or who is authenticated or managed by the device. The authenticated users consist of local user and external user. The local users are created by administrators. They belong to different local authentication servers, and are stored in system's configuration files. The external users are stored in external servers, such as AD server or LDAP server. System supports User Group to facilitate user management. Users belonging to one local authentication server can be allocated to different user groups, while one single user can belong to different user groups simultaneously; similarly, user groups belonging to one local authentication server can be allocated to different user groups, while one single user group can belong to different user groups simultaneously. The following diagram uses the default AAA server, Local, as an example and shows the relationship between users and user groups:



As shown above, User1, User2 and User3 belong to UserGroup1, while User3 also belongs to UserGroup2, and UserGroup2 also contains User4, User5 and UserGroup1.

Configuring a Local User

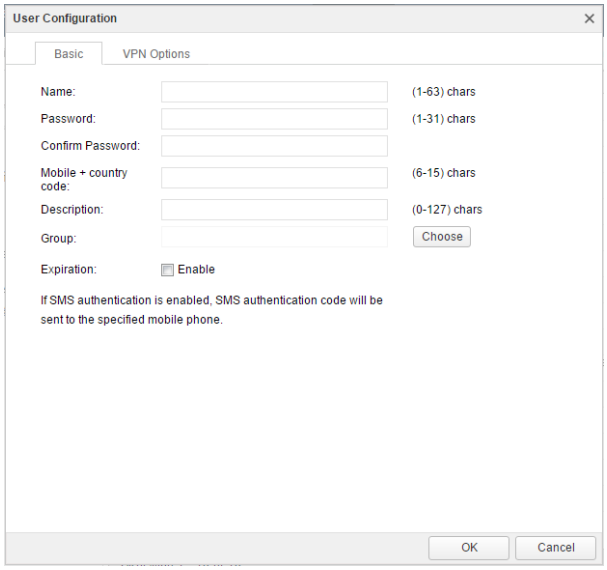
This section describes how to configure a local user and user group.

- Click the "Local server" drop-down box in the upper left corner of the page to switch the local user's server.
- Red Expired, orange Will expire within a week and yellow Will expire within a month colors are used to mark the expired users , expired within a week, expired within a month in the list.

Creating a Local User

To create a local user, take the following steps:

1. Select **Object > User > Local User**.
2. Click **New > User**.



In the Basic tab in User Configuration dialog box, configure the following.

Option	Description
Name	Specifies a name for the user.
Password	Specifies a password for the user.
Confirm password	Type the password again to confirm.
Mobile+country code	Specifies the user's mobile number. When users log into the SCVPN client, system will send the verification code to the mobile number.
Description	If needed, type the description of the user.
Group	Add the user to a selected usergroup. Click **Choose**, and in the Choose User Group dialog box, select the usergroup you want and click **Add**.
Expiration	Select the **Enable** check box to enable expiration for the user, and then specify a date and time. After expiration, the user cannot be authenticated, therefore cannot be used in system. By default expiration is not enabled.

In the VPN Options tab, configure network parameters for the PnPVPN client.

Option	Description
IKE ID	Specifies a IKE ID type for dial-up VPN users. If FQDN or ASN1 is selected, type the ID's content in the text box below.
DHCP Start IP	Specifies a start IP for the DHCP address pool.
DHCP End IP	Specifies an end IP for the DHCP address pool.
DHCP Netmask	Specifies a netmask for the DHCP address pool.
DHCP Gateway	Specifies a gateway for the DHCP address pool. The IP address of the gateway corresponds to the IP address of PnPVPN client's Intranet interface and PC's gateway address. The PC's IP address is determined by the segment and netmask configured in the above DHCP address pool. Therefore, the gateway's address and DHCP address pool should be in the same segment.

Option	Description
DNS1	Specifies an IP address for the DNS server. You can specify one primary DNS server (DNS1) and up to three alternative DNS servers.
DNS2	
DNS3	
DNS4	
WINS1	Specifies an IP address for the WINS server. You can specify one primary WINS server (WINS1)and one alternative WINS server.
WINS2	
Tunnel IP 1	Specifies an IP address for the master PnPVPN client's tunnel interface. Select the **Enable SNAT** check box to enable SNAT.
Tunnel IP 2	Specifies an IP address for the backup PnPVPN client's tunnel interface.

3. Click **OK**.

Creating a User Group

To create a user group, take the following steps:

1. Select **Object > User > Local User**.
2. Click **New > User Group**.
3. Type the name of the user group into the Name box.
4. Specify members for the user group. Expand User or User Group in the Available list, select a user or user group and click **Add** to add it to the Selected list on the right. To delete a selected user or user group, select it in the Selected list and then click **Remove**. One user group can contain multiple users or user groups, but system only supports up to 5 layers of nested user groups and does not support the loopback nest. Therefore, a user group should not nest the upper-layer user group it belongs to.
5. Click **OK**.

Import User Password List

Import user binding list to system, take the following steps:

1. Select **Object>User> Local User**.
2. Click **Import User Password List**, and the **Import User Password List** dialog box pops up.
3. Click **Browse** to select the file name needed to be imported.
4. Click **OK** to finish import.

Export User Password List

Export user binding list from system to local, take the following steps:

1. Select **Object>User> Local User**.
2. Click **Export User Password List**, and the **Export User Password List** dialog box pops up, and select the saved position in local.
3. Click **OK** to finish export.

Note:

- The user password in the import/export file is in encrypted text;.
- Please try to keep the import file format consistent with the export file.
- When importing,if the same user name exists under the same server, the original user password will be overwritten.

Configuring a LDAP User

This section describes how to configure a LDAP user.

Synchronizing Users

To synchronize users in a LDAP server, firstly, you need to configure a LDAP server, refer to "Configuring LDAP Server" on Page 223.To synchronize users:

1. Select **Object > User > LDAP User**.
2. Select a server from the LDAP Server drop-down list, and click **Sync Users**.

Note: By default, after creating a LDAP server, system will synchronize the users of the LDAP server automatically, and then continue to synchronize every 30 minutes.

Configuring an Active Directory User

This section describes how to configure an active directory (AD) user.

Synchronizing Users

To synchronize users in an AD server to the device, first you need to configure an AD server ,refer to "Configuring Active Directory Server" on Page 220. To synchronize users, take the following steps:

1. Select **Object > User >AD User**.
2. Select an AD server from the Active Directory Server drop-down list, and click **Sync Users**.

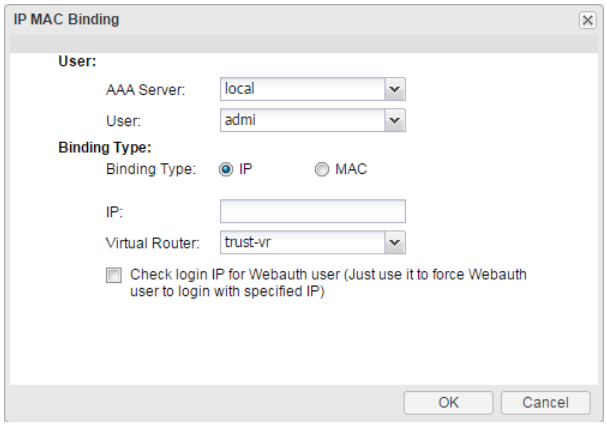
Note: By default, after creating an AD server, system will synchronize the users of the AD server automatically, and then continue to synchronize every 30 minutes.

Configuring a IP-User Binding

Adding User Binding

To bind an IP or MAC address to a user, take the following steps:

1. Select **Object > User > IP-User Binding** .
2. Click **Add User Binding**.



Configure the following options.

User	
AAA Server	Select an AAA server from the drop-down list.
User	Select a user for the binding from the drop-down list.
Binding Type	
Binding Type	By specifying the binding type, you can bind the user to a IP address or MAC address. • IP - If IP is selected, type the IP address into the IP text box. And select a VR from the Virtual Router drop-down list. Select the **Check WebAuth IP-User Mapping Relationship** check box to apply the IP-User mapping only to the check for IP-user mapping during Web authentication if needed. • MAC - If MAC is selected, type the MAC address into the MAC text box. And select a VR from the Virtual Router drop-down list.

3. Click **OK**.

Import Binding

Import user binding list to system, take the following steps:

1. Select **Object>User> IP-User Binding**.
2. Click **Import** , and the **Import User Binding List** dialog box pops up.
3. Click **Browse** to select the file name needed to be imported.
4. Click **OK** to finish import.

Export Binding

Export user binding list from system to local, take the following steps:

1. Select **Object>User> IP-User Binding**.
2. Select the exported user category(include local,LDAP,AD and all users) in the **Export** drop-down list to pop up the export dialog box, and select the saved position in local.
3. Click **OK** to finish export.

Role

Roles are designed with certain privileges. For example, a specific role can gain access to some specified network resources, or make exclusive use of some bandwidth. In StoneOS, users and privileges are not directly associated. Instead, they are associated by roles.

The mappings between roles and users are defined by role mapping rules. In function configurations, different roles are assigned with different services. Therefore, the mapped users can gain the corresponding services as well.

System supports role combination, i.e., the AND, NOT or OR operation on roles. If a role is used by different modules, the user will be mapped to the result role generated by the specified operation.

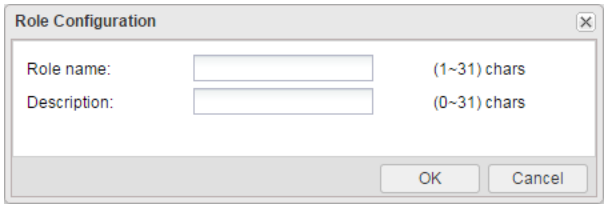
System supports the following role-based functions:

- Role-based policy rules: Implements access control for users of different types.
- Role-based QoS: Implements QoS for users of different types.
- Role-based statistics: Collects statistics on bandwidth, sessions and new sessions for users of different types.
- Role-based session limits: Implements session limits for specific users.
- SCVPN role-based host security detection: Implements control over accesses to specific resources for users of different types.
- Role-based PBR: Implements routing for users of different types.

Creating a Role

To create a role, take the following steps:

1. Select **Object > Role > Role**.
2. Click **New**.



Configure the following options.

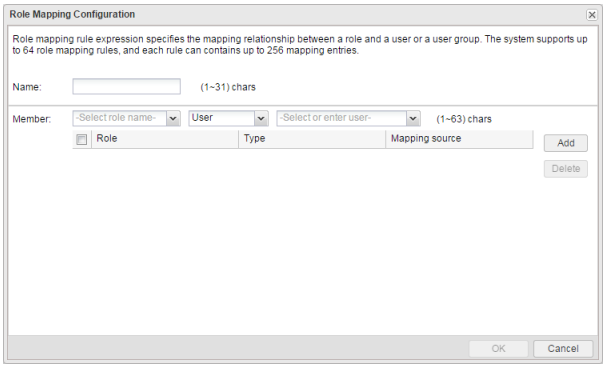
Option	Description
Role Name	Type the role name into the Role Name box.
Description	Type the description for the role into the Description box.

3. Click **OK**.

Creating a Role Mapping Rule

To create a role mapping rule, take the following steps:

1. Select **Object > Role > Role Mapping** .
2. Click **New**.

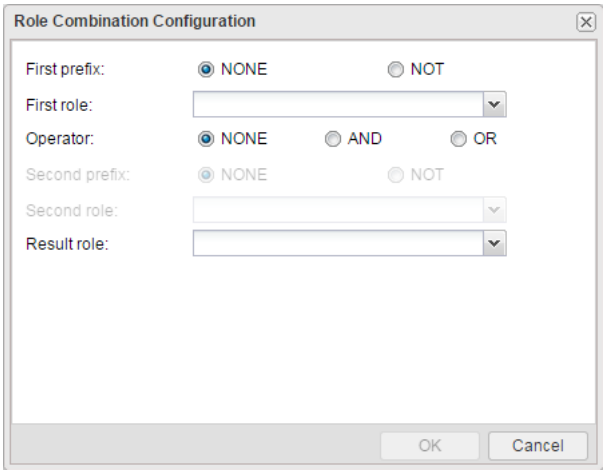


3. Type the name for the rule mapping rule into the Name box.
4. In the Member section, select a role name from the first drop-down list, and then select a user, user group, certificate name (the CN field of USB Key certificate) or organization unit (the OU field of USB Key certificate) from the second drop-down list. If User, User group, CN or OU is selected, also select or enter the corresponding user name, user group name, CN or OU into the box behind.
5. Click **Add** to add to the role mapping list.
6. If needed, repeat Step 4 and Step 5 to add more mappings. To delete a role mapping, select the role mapping you want to delete from the mapping list, and click **Delete**.
7. Click **OK**.

Creating a Role Combination

To create a role combination, take the following steps:

1. Select **Object > Role > Role Combination**.
2. Click **New**.



Configure the following options.

Option	Description
First Prefix	Specifies a prefix for the first role in the role regular expression.
First Role	Select a role name from the First Role drop-down list to specify a name for the first role in the role regular expression.

Option	Description
Operator	Specifies an operator for the role regular expression.
Second Prefix	Specifies a prefix for the second role in the role regular expression.
Second Role	Select a role name from the Second Role drop-down list to specify a name for the second role in the role regular expression.
Result Role	Select a role name from the Result Role drop-down list to specify a name for the result role in the role regular expression.

3. Click **OK**.

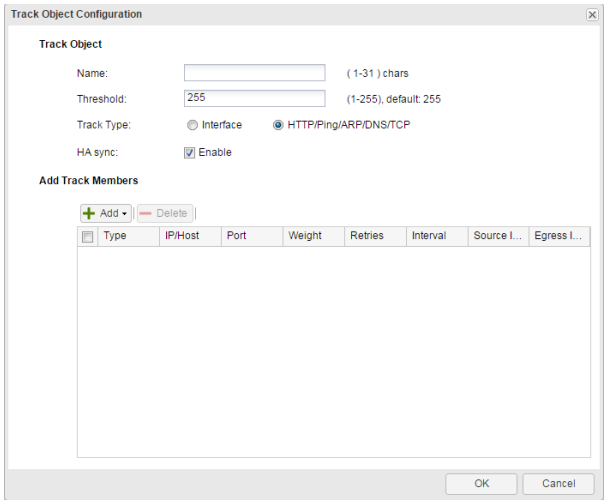
Track Object

The devices provide the track object to track if the specified object (IP address or host) is reachable or if the specified interface is connected. This function is designed to track HA and interfaces.

Creating a Track Object

To create a track object, take the following steps:

1. Select **Object > Track Object**.
2. Click **New**.



Configure the following options.

Option	Description
Name	Specifies a name for the new track object.
Threshold	Type the threshold for the track object into the text box. If the sum of weights for failed entries in the track object exceeds the threshold, system will conclude that the whole track object fails.

Track Type	Select a track object type. One track object can only be configured with one type.
	Select **Interface** radio button:
	• Click **Add** in Add Track Members section and then configure the following options in the Add Interfaces dialog box:
	  • Interface - Select a track interface from the drop-down list.
	  • Weight - Specifies a weight for the interface, i.e. the weight for overall failure of the whole track object if this track entry fails.
	Select **HTTP Ping ARP DNS TCP** radio button:
	• Click **Add**, select a packet type from the drop-down list, and then configure the following options in the Add HTTP/Ping/ARP/DNS/TCP Member dialog box:
	  • IP/Host - Specifies an IP address or host name for the track object when the track is implemented by HTTP/Ping/TCP packets.

Option	Description
	IP - Specifies an IP address for the track object when the track is implemented by ARP packets. DNS - Specifies an IP address for the track object when the track is implemented by DNS packets. • Weight - Specifies a weight for overall failure of the whole track object if this track entry fails. • Retries: Specifies a retry threshold. If no response packet is received after the specified times of retries, system will determine this track entry fails, i.e., the track entry is unreachable. The value range is 1 to 255. The default value is 3. • Interval - Specifies an interval for sending packets. The value range is 1 to 255 seconds. The default value is 3. • Egress Interface - Specifies an egress interface from which HTTP/Ping/ARP/DNS/TCP packets are sent. • Source Interface- Specifies a source interface for HTTP/Ping/ARP/DNS/TCP packets.
HA sync	Select this check box to enable HA sync function. The primary device will synchronize its information with the backup device.

3. Click **OK.**

URL Filter

URL filter controls the access to some certain websites and records log messages for the access actions. URL filter helps you control the network behaviors in the following aspects:

- Access control to certain category of websites, such as gambling and pornographic websites.
- Access control to certain category of websites during the specified period. For example, forbid to access IM websites during the office hours.
- Access control to the website whose URL contains the specified keywords. For example, forbid to access the URL that contains the keyword of game.

If IPv6 is enabled, you can configure URL and keyword for both IPv4 and IPv6 address. How to enable IPv6, see StoneOS_CLI_User_Guide_IPv6.

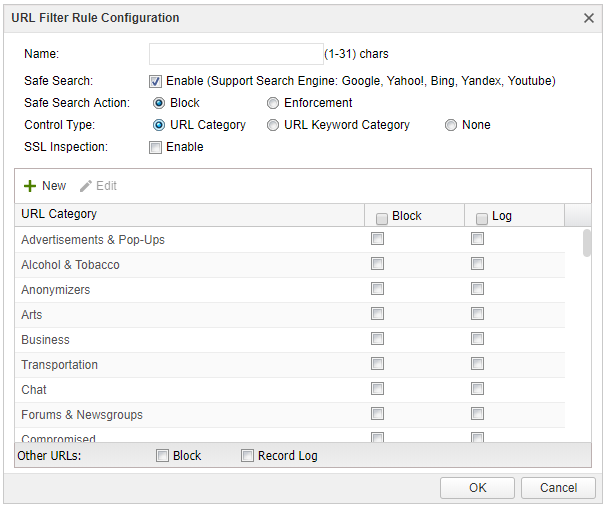
Configuring URL Filter

Configuring URL filter contains two parts:

- Create a URL filter rule
- Bind a URL filter rule to a security zone or policy rule

Part 1: Creating a URL filter rule

1. Select **Object > URL Filter**.
2. Click **New**.



In the URL Filter Rule Configuration dialog box, configure the following options.

Option	Description
Name	Specifies the name of the rule. You can configure the same URL filter rule name in different VSYSs.
Safe Search	Many search engines, such as Google, Bing, Yahoo!, Yandex, and YouTube, all have a "SafeSearch" setting, which can filter adult content, and then return search results at different levels based on the setting. The system supports the safe search function in the URL filtering Profile to detect the "SafeSearch" setting of search engine and perform corresponding control actions. Select the **Enable** check box to enable the safe search function to detect the settings of the search engine's "SafeSearch" and perform cor-

Option	Description
	responding control actions.  **Note:** • The safe search function only can be used in the following search engines currently: Google, Bing, Yahoo!, Yandex, and YouTube. • The safe search function only can be used in combination with the SSL proxy function because the search engine uses the HTTPS protocol. Therefore, when the "SafeSearch" is enabled, enable the SSL proxy function for the policy rule which is bound with URL filter profile. • To ensure the valid "SafeSearch" function of Google, you need to configure policy rules to block the UDP 80 and UDP 443 port.
Safe Search Action	Specifies the safe search action. • Block: Selects the check box to specify the action as block, When the " SafeSearch" setting of search engine is not set, users will be prevented from accessing the search page and a warning page will pop up which provides users with the link for "SafeSearch" setting. • Enforcement: Selects the check box to specify the action as execute. When the "SafeSearch" setting of search engine is not set, system will force to set it at the "strict" level.
Control Type	Control types are **URL Category**, **URL Keyword Category**, and **Web Surfing Record**. You can select one type for each URL filter rule. **URL Category** controls the access to some certain category of website. The options are: • SSL inspection: Select the **Enable** check box to enable SSL negotiation packets inspection. For HTTPS traffic, system can acquire the domain name of the site which you want to access from the SSL negotiation packets after this feature is configured. Then, system will perform URL filter in accordance with the domain name. If SSL proxy is configured at the same time, SSL negotiation packets inspection method will be preferred for URL filter. • New: Creates a new URL category. For more information about URL categories, see "User-defined URL DB" on Page 242. • Edit: Selects a URL category from the list, and click **Edit** to edit the selected URL category. • URL category: Shows the name of pre-defined and user-defined URL categories in the VSYS. • Block: Selects the check box to block access to the corresponding URL category.

Option	Description
	• Log: Selects the check box to log access to the corresponding URL category. • Other URLS: Specifies the actions to the URLs that are not in the list, including **Block Access** and **Record Log**. **URL Keyword Category** controls the access to the website whose URL contains the specific keywords. Click the **URL Keyword Category**option to configure. The options are: • New: Creates new keyword categories. For more information about keyword category, see "Keyword Category" on Page 245. • Edit: Select a URL keyword category from the list, and click **Edit** to edit the selected URL keyword categories. • Keyword category: Shows the name of the configured keyword categories. • Block: Selects the check box to block access to the website whose URL contains the specified keywords. • Log: Selects the check box to log the access to the website whose URL contains the specified keywords. • Other URLS: Specifies the actions to the URLs that do not contain the keywords in the list, including **Block Access** and **Record Log**.

3. Click **OK** to save the settings.

Part 2: Binding a URL filter rule to a security zone or security policy rule

The URL filter configurations are based on security zones or policies.

- If a security zone is configured with the URL filter function, system will perform detection on the traffic that is destined to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the URL filter function, system will perform detection on the traffic that is destined to the policy rule you specified, and then respond.
- The threat protection configurations in a policy rule are superior to that in a zone rule if they are specified at the same time, and the URL filter configurations in a destination zone are superior to that in a source zone if they are specified at the same time.

To create the zone-based URL filter, take the following steps:

1. Create a zone. For more information about how to create this, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog box, select the Threat Protection tab.
3. Enable the threat protection that you need, and select the URL filter rules from the profile drop-down list below; you can click **Add Profile** from the profile drop-down list below to creat a URL filter rule. For more information, see "Part 1: Creating a URL filter rule" on Page 237.
4. Click **OK** to save the settings.

To create the policy-based URL filter, take the following steps:

1. Configure a security policy rule. For more information, see "Configuring a Security Policy Rule" on Page 281.
2. In the Protection tab, select the **Enable** check box of URL Filter.
3. From the **Profile** drop-down list, select a URL filter rule. You can also click **Add Profile** to create a new URL filter

rule.

4. Click **OK** to save the settings.

If necessary, you can go on to configure the functions of "Predefined URL DB" on Page 241, "URL Lookup" on Page 244, and "Warning Page" on Page 246.

Object	Description
Predefined URL DB	The predefined URL database includes dozens of categories and tens of millions of URLs and you can use it to specify the URL categories.
URL Lookup	Use the URL lookup function to inquire URL information from the URL database, including the URL category and the category type.
Warning Page	• Block warning: When your network access is blocked, a warning page will prompt in the Web browser. • Audit warning: When your network access is audited, a warning page will prompt in the Web browser.

Note:

- Only after cancelling the binding can you delete the URL filter rule.
- To get the latest URL categories, you are recommended to update the URL database first. For more information about URL database, see "Predefined URL DB" on Page 241.
- You can export the log messages to specified destinations. For more information about log messages, see "Log Configuration" on Page 439.

Viewing URL Hit Statistics

The URL access statistics includes the following parts:

- Summary: The statistical information of the top 10 user/IPs, the top 10 URLs, and the top 10 URL categories during the specified period of time are displayed.
- User/IP: The user/IP and detailed hit count are displayed.
- URL:The URL and detailed hit count are displayed.
- URL Category:The URL category and detailed hit count and traffic are displayed.

To view the URL hit statistics, see "URL Hit" on Page 399 in Monitor.

- To view the URL hit statistics, enable **URL Hit** in "Monitor Configuration" on Page 410.
- To view the traffic of the URL category, enable **URL Hit** and **URL Category Bandwidth** in "Monitor Configuration" on Page 410.

Viewing Web Surfing Records

To view the Web surfing records, view "URL Logs" on Page 434. Before you view the Web surfing records, see "Log Configuration" on Page 439 to enable URL Log function.

Configuring URL Filter Objects

When using URL filter function, you need to configure the following objects:

Object	Description
Predefined URL DB	The predefined URL database includes dozens of categories and tens of millions of URLs and you can use it to specify the URL categories.

Object	Description
User-defined URL DB	The user-defined URL database is defined by you and you can use it to specify the URL category.
URL Lookup	Use the URL lookup function to inquire URL information from the URL database.
Keyword Category	Use the keyword category function to customize the keyword categories.
Warning Page	• Block warning: When your network access is blocked, a warning page will prompt in the Web browser. • Audit warning: When your network access is audited, a warning page will prompt in the Web browser.

Predefined URL DB

System contains a predefined URL database.

Note: The predefined URL database is controlled by a license . Only after a URL license is installed, the predefined URL database can be used.

The predefined URL database provides URL categories for the configurations of a URL filter. It includes dozens of categories and tens of millions of URLs .

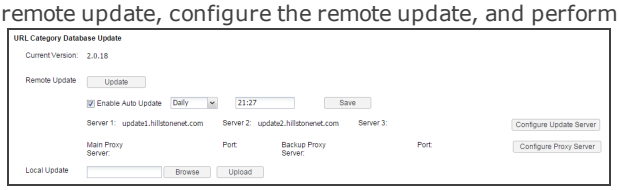
When identifying the URL category, the user-defined URL database has a higher priority than the predefined URL database.

Configuring Predefined URL Database Update Parameters

By default, system updates predefined URL database everyday. You can change the update parameters according to your own requirements. Currently, two default update servers are provided: update1.hillstonenet.com and update2.hillstonenet.com. Besides, you can update the predefined URL database from your local disk.

To change the update parameters, take the following steps:

1. Select **System > Upgrade Management > Signature Database Update**.
2. In the URL category database update section, you can view the current version of the database, perform the remote update, configure the remote update, and perform the local update.



3. Select **Enable Auto Update** to enable the automatic update function and then continue to specify the frequency and time. Click **OK** to save your settings.
4. Click **Configure Update Server** to configure the update server URL. In the pop-up dialog box, specify the URL or IP address of the update server, and select the virtual router that can connect to the server. To restore the URL settings to the default ones, click **Restore Default**.
5. Click **Configure Proxy Server**, then enter the IP addresses and ports of the main proxy server and the backup proxy server. When the device accesses the Internet through a HTTP proxy server, you need to specify the IP address and the port number of the HTTP proxy server. With the HTTP proxy server specified, various signature databases can update normally.
6. Click **OK** to save the settings.

Upgrading Predefined URL Database Online

To upgrade the URL database online, take the following steps:

1. Select **System > Upgrade Management > Signature Database Update**.
2. In the URL category database update section, click **Update** to update the predefined URL database.

Upgrading Predefined URL Database from Local

To upgrade the predefined URL database from local, take the following steps:

1. **System > Upgrade Management > Signature Database Update**
2. In the URL category database update section, click **Browse** to select the URL database file from your local disk.
3. Click **Upload** to update the predefined URL database.

Note: You can not upgrade the predefined URL database from local in non-root VSYS.

User-defined URL DB

Besides categories in predefined URL database, you can also create user-defined URL categories, which provides URL categories for the configurations of URL filter. When identifying the URL category, the user-defined URL database has a higher priority than the predefined URL database.

System provides three predefined URL categories: custom1, custom2, custom3. You can import your own URL lists into one of the predefined URL categories.

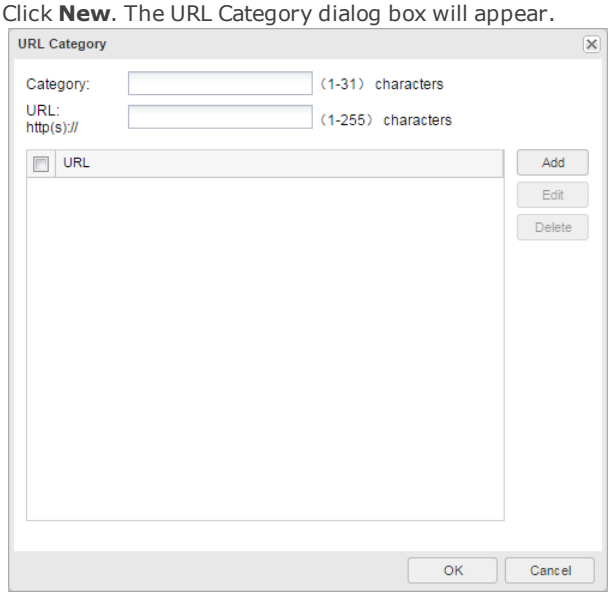
Note: You can not import your own URL lists into one of the predefined URL category in non-root VSYS.

Configuring User-defined URL DB

To configure a user-defined URL category, take the following steps:

1. Select **Policy > URL Filter**.
2. At the top-right corner, select **Configuration > User-defined URL DB**. The User-defined URL DB dialog box will appear.

3. Click **New**. The URL Category dialog box will appear.



4. Type the category name in the **Category** box. URL category name cannot only be a hyphen (-). And you can create at most 16 user-defined categories.
5. Type a URL into the **URL http://** box.
6. Click **Add** to add the URL and its category to the table.
7. To edit an existing one, select it and then click **Edit**. After editing it, click **Add** to save the changes.
8. Click **OK** to save the settings.

Importing User-defined URL

System supports to batch imported user-defined URL lists into the predefined URL category named custom1/2/3. To import user-defined URL, take the following steps:

1. Select **Object > URL Filter**.
2. At the top-right corner, select **Configuration > User-defined URL DB**. The User-defined URL DB dialog box will appear.
3. Select one of the predefined URL category(custom1/2/3), and then click **Import**.
4. In the Batch Import URL dialog box, click **Browse** button to select your local URL file. The file should be less than 1 M, and have at most 1000 URLs. Wildcard is supported to use once in the URL file, which should be located at the start of the address.
5. Click **OK** to finish importing.

Clearing User-defined URL

In the predefined URL category named custom1/2/3, clear a user-defined URL, take the following steps:

1. Select **Object > URL Filter**.
2. At the top-right corner, select **Configuration > User-defined URL DB**. The User-defined URL DB dialog box will appear.
3. Select one of the predefined URL categories(custom1/2/3), and then click **Clear**. The URL in the custom 1/2/3 will be cleared from the system.

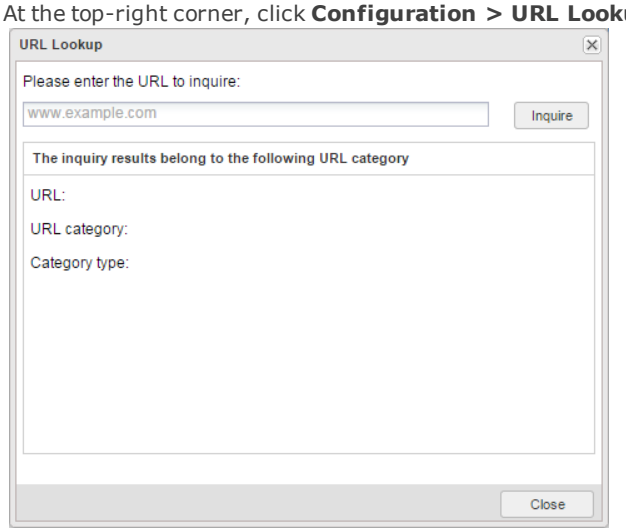
URL Lookup

You can inquire a URL to view the details by URL lookup, including the URL category and the category type.

Inquiring URL Information

To inquiry URL information, take the following steps:

1. Select **Policy > URL Filter**.
2. At the top-right corner, click **Configuration > URL Lookup**. The URL Lookup dialog box will appear.



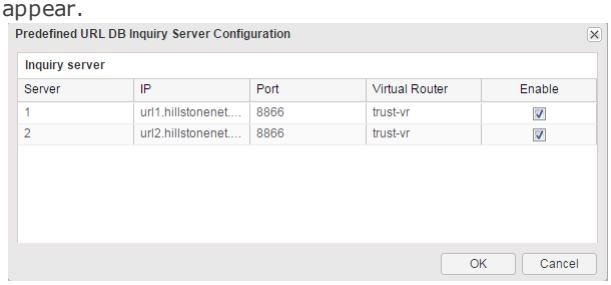
3. Type the URL into the **Please enter the URL to inquire** box.
4. Click **Inquire**, and the results will be displayed at the bottom of the dialog box.

Configuring URL Lookup Servers

URL lookup server can classify an uncategorized URL (URL is neither in predefined URL database nor in user-defined URL database) you have accessed, and then add it to the URL database during database updating. Two default URL lookup servers are provided: url1.hillstonenet.com and url2.hillstonenet.com. By default, the URL lookup servers are enabled.

To configure a URL lookup server, take the following steps:

1. Select **Policy > URL Filter**.
2. At the top-right corner, Select **Configuration > Predefined URL DB**. The Predefined URL DB dialog box will appear.
3. Click **Inquiry Server Configuration**. The Predefined URL DB Inquiry Server Configuration dialog box will appear.



4. In the Inquiry server section, double-click the cell in the IP/Port/Virtual Router column of Server1/2 and type a new value.

5. Select the check box in the **Enable** column to enable this URL lookup server.
6. Click **OK** to save the settings.

Keyword Category

You can customize the keyword category and use it in the URL filter function.

After configuring a URL filter rule, system will scan traffic according to the configured keywords and calculate the trust value for the hit keywords. The calculating method is: adding up the results of *times* * *trust value* of each keyword that belongs to the category. Then system compares the sum with the threshold 100 and performs the following actions according to the comparison result:

- If the sum is larger than or equal to category threshold (100), the configured category action will be triggered;
- If more than one category action can be triggered and there is block action configured, the final action will be Block;
- If more than one category action can be triggered and all the configured actions are Permit, the final action will be Permit.

For example, a URL filter rule contains two keyword categories C1 with action block and C2 with action permit. Both of C1 and C2 contain the same keywords K1 and K2. Trust values of K1 and K2 in C1 are 20 and 40. Trust values of K1 and K2 in C2 are 30 and 80.

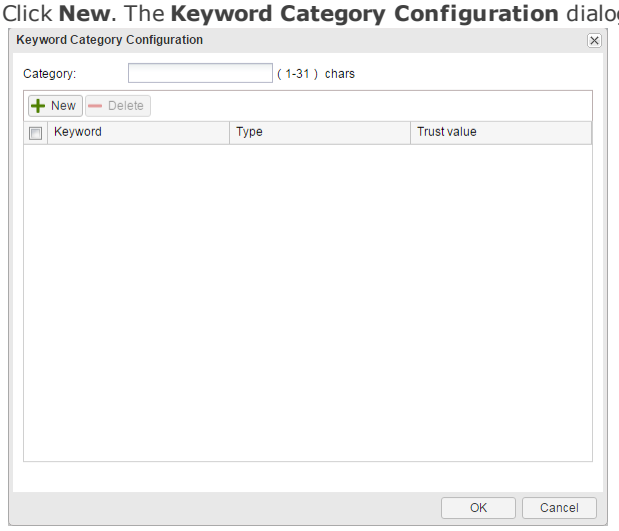
If system detects 1 occurrence of K1 and K2 each on a URL, then C1 trust value is 20*1＋40*1=60<100, and C2 trust value is 30*1+80*1=110>100. As a result, the C2 action is triggered and the URL access is permitted.

If system detects 3 occurrences of K1 and 1 occurrence of K2 on a URL, then C1 trust value is 20*3+40*1=100, and C2 trust value C2 is 30*3+80*1=170>100. Conditions for both C1 and C2 are satisfied, but the block action for C1 is triggered, so the web page access is denied.

Configuring a Keyword Category

To configure a keyword category, take the following steps:

1. Select **Policy > URL Filter**.
2. At the top-right corner, select **Configuration > Keyword Category**. The Keyword Category dialog box will appear.
3. Click **New**. The **Keyword Category Configuration** dialog box will appear.



4. Type the category name.

5. Click **New**. In the slide area, specify the keyword, character matching method (simple/regular expression), and trust value (100 by default).
6. Click **Add** to add the keyword to the list below.
7. Repeat the above steps to add more keywords.
8. To delete a keyword, select the keyword you want to delete from the list and click **Delete**.
9. Click **OK** to save your settings.

Warning Page

The warning page shows the user block information and user audit information.

Configuring Block Warning

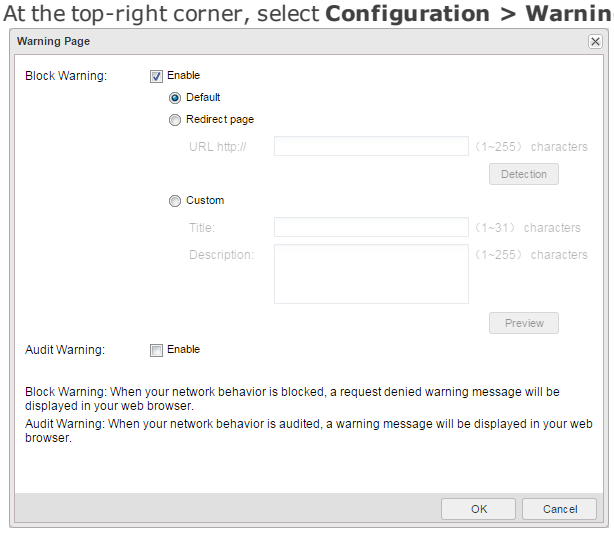
If the internet behavior is blocked by the URL filter function, the Internet access will be denied. The information of Access Denied will be shown in your browser, and some web surfing rules will be shown to you on the warning page at the same time. According to the different network behaviors, the default block warning page includes the following two situations:

- Visiting a certain type of URL.

- Visiting the URL that contains a certain type of keyword category.

The block warning function is disabled by default. To configure the block warning function, take the following steps:

1. Click **Object > URL Filter**.
2. At the top-right corner, select **Configuration > Warning Page**. The Warning Page dialog box will appear.



3. In the Block Warning section, select **Enable**.

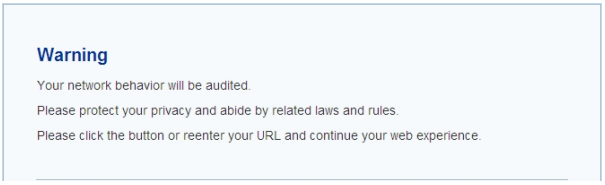
4. **Configure the display information in the blocking warning page.**

Option	Description
Default	Use the default blocking warning page as shown above.
Redirect page	Redirect to the specified URL. Type the URL in the **URL http://** box. You can click Detection to verify whether the URL is valid.
Custom	Customize the blocking warning page. Type the title in the **Title** box and the description in the **Description** box. You can click **Preview** to preview the blocking warning page.

5. Click **OK** to save the settings.

Configuring Audit Warning

After enabling the audit warning function, when your network behavior matches the configured URL filter rule, your HTTP request will be redirected to a warning page where the audit and privacy protection information is displayed. See the picture below:



The audit warning function is disabled by default. To configure the audit warning function, take the following steps:

1. Select **Object > URL Filter**.

2. At the top-right corner, select **Configuration > Warning Page**. The Warning Page dialog box will appear.

3. In the Audit Warning section, select **Enable**.

4. **Configure the display information in the audit warning page.**

Option	Description
Default	Use the audit blocking warning page as shown above.
Custom	Customize the audit blocking warning page. Type the title in the **Title** box and the description in the **Description** box. You can click **Preview** to preview the audit warning page.

5. Click **OK** to save the settings.

Data Security

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

The data security function allows you to flexibly configure control rules to comprehensively control and audit (by behavior logs and content logs) on user network behavior.

Data security can audit and filter in the following network behaviors:

Function	Description
File filter	Checks the files transported through HTTP, FTP, SMTP, POP3 protocols and control them according to the file filter rules.

Content filter	• Web content :Controls the network behavior of visiting the webpages that contain certain keywords, and log the actions.
	• Web posting: Controls the network behavior of posting on websites and posting specific keywords, and logs the posting action and posted content.
	• Email filter: Controls and audit SMTP mails :
	  • Control and audit all the behaviors of sending emails;
	  • Control and audit the behaviors of sending emails that contain specific sender, recipient, keyword or attachment.
	• HTTP/FTP control: Controls and audits the actions of HTTP and FTP applications:
	  • FTP methods, including Login, Get, and Put;
	  • HTTP methods, including Connect, Get, Put, Head, Options, Post, and Trace;

Network Behavior Record	Audits the IM applications behaviors and record log messages for the access actions.

Configuring Data Security Objects

When using the data security function, you need to configure the following objects for the data securityrules:

Object	Description
Predefined URL DB	The predefined URL database includes dozens of categories and tens of millions of URLs and you can use it to specify the URL category and URL range for the URL category/Web posting functions.
User-defined URL DB	The user-defined URL database is defined by yourself and you can use it to specify the URL category and URL range for the URL category/Web posting functions.
URL Lookup	Use the URL lookup function to inquire URL information from the URL database.
Keyword Category	Use the keyword category function to customize the keyword categories. You can use it to specify the keyword for the URL category/Web posting/email filter functions.
Warning Page	• Block warning: When your network access is blocked, you will be prompted with a warning page in the Web browser. • Audit warning: When your network access is audited, you will be prompted with a warning page in the Web browser.
Bypass Domain	Domains that are not controlled by the internet behavior control rules.
User Exception	Users that are not controlled by the internet behavior control rules.

Predefined URL DB

The system contains a predefined URL database.

Note: The predefined URL database is controlled by a license controlled. Only after a URL license is installed, the predefined URL database can be used.

The predefined URL database provides URL categories for the configurations of Web content/Web posting. It includes dozens of categories and tens of millions of URLs .

When identifying the URL category of a URL, the user-defined URL database has a higher priority than the predefined URL database.

Configuring Predefined URL Database Update Parameters

By default, the system updates predefined URL database everyday. You can change the update parameters according to your own requirements. Currently, two default update servers are provides: update1.hillstonenet.com and update2.hillstonenet.com. Besides, you can update the predefined URL database from your local disk.

To change the update parameters:

1. Select **System > Upgrade Management > Signature Database Update**.
2. In the URL category database update section, you can view the current version of the database, perform the remote update, configure the remote update, and perform the local update.

3. Select **Enable Auto Update** to enable the automatic update function. And then continue to specify the frequency and time. Click **OK** to save your settings.
4. Click **Configure Update Server** to configure the update server URL. In the pop-up dialog, specify the URL or IP address of the update server, and select the virtual router that can connect to the server. To restore the URL settings to the default ones, click **Restore Default**.
5. Click **Configure Proxy Server**, then enter the IP addresses and ports of the main proxy server and the backup proxy server. When the device accesses the Internet through a HTTP proxy server, you need to specify the IP address and the port number of the HTTP proxy server. With the HTTP proxy server specified, various signature database can update normally.
6. Click **OK** to save the settings.

Upgrading Predefined URL Database Online

To upgrade the URL database online:

1. Select **System > Upgrade Management > Signature Database Update**.
2. In the URL category database update section, click **Update** to update the predefined URL database.

Upgrading Predefined URL Database from Local

To upgrade the predefined URL database from local:

1. **System > Upgrade Management > Signature Database Update**
2. In the URL category database update section, click **Browse** to select the URL database file from your local disk.
3. Click **Upload** to update the predefined URL database.

User-defined URL DB

Besides categories in predefined URL database, you can also create user-defined URL categories, which provides URL categories for the configurations of Web content/Web posting. When identifying the URL category, the user-defined URL database has a higher priority than the predefined URL database.

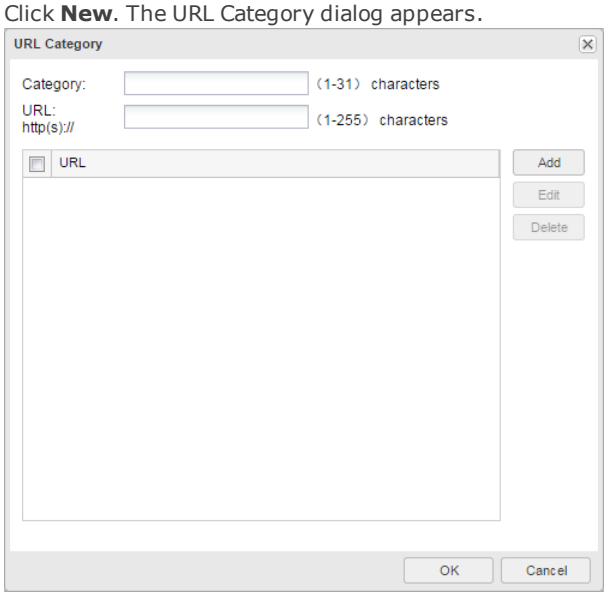
System provides three predefined URL categories: custom1, custom2, custom3. You can import your own URL lists into one of the predefined URL category.

Configuring User-defined URL DB

To configure a user-defined URL category:

1. Select **Object >Data Security>Content Filter> Web Content/Web Posting**.
2. At the top-right corner, select **Configuration > User-defined URL DB**. The User-defined URL DB dialog appears.

3. Click **New**. The URL Category dialog appears.



4. Type the category name in the **Category** box. URL category name cannot only be a hyphen (-). And you can create at most 16 user-defined categories.
5. Type a URL into the **URL http://** box.
6. Click **Add** to add the URL and its category to the table.
7. To edit an existing one, select it and then click **Edit**. After editing it, click **Add** to save the changes.
8. Click **OK** to save the settings.

Importing User-defined URL

System supports to batch import user-defined URL lists into the predefined URL category named custom1/2/3. To import user-defined URL:

1. Select **Object > URL Filter**.
2. At the top-right corner, select **Configuration > User-defined URL DB**. The User-defined URL DB dialog appears.
3. Select one of the predefined URL category(custom1/2/3), and then click **Import**.
4. In the Batch Import URL dialog, click **Browse** button to select your local URL file. The file should be less than 1 M, and has at most 1000 URLs. Wildcard is supported to use once in the URL file, which should be located at the start of the address.
5. Click **OK** to finish importing.

Clearing User-defined URL

In the predefined URL category named custom1/2/3, clear user-defined URL:

1. Select **Object > URL Filter**.
2. At the top-right corner, select **Configuration > User-defined URL DB**. The User-defined URL DB dialog appears.
3. Select one of the predefined URL category(custom1/2/3), and then click **Clear**, the URL in the custom 1/2/3 will be cleared from the system.

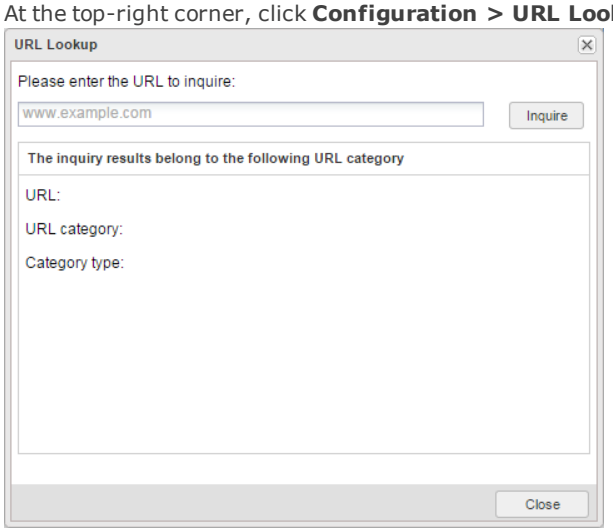
URL Lookup

You can inquire a URL to view the details by URL lookup, including the URL category and the category type.

Inquiring URL Information

To inquiry URL information:

1. Select **Object > Data Security>Content Filter> Web Content/Web Posting**.
2. At the top-right corner, click **Configuration > URL Lookup**. The URL Lookup dialog appears.



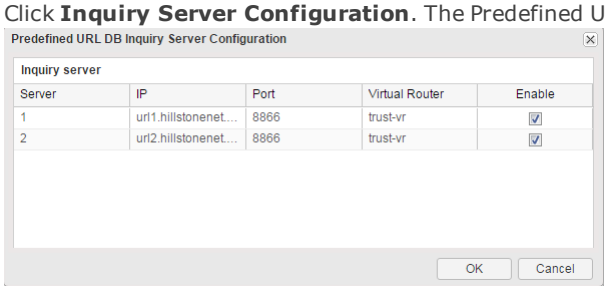
3. Type the URL into the **Please enter the URL to inquire** box.
4. Click **Inquire**, and the results will be displayed at the bottom of the dialog.

Configuring URL Lookup Servers

URL lookup server can classify an uncategorized URL (URL is neither in predefined URL database nor in user-defined URL database) you have accessed, and then add it to the URL database during database updating. Two default URL lookup servers are provided: url1.hillstonenet.com and url2.hillstonenet.com. By default, the URL lookup servers are enabled.

To configure a URL lookup server:

1. Select **Object > Data Security>Content Filter> Web Content/Web Posting**.
2. At the top-right corner, Select **Configuration > Predefined URL DB**. The Predefined URL DB dialog appears.
3. Click **Inquiry Server Configuration**. The Predefined URL DB Inquiry Server Configuration dialog appears.



4. In the Inquiry server section, double-click the cell in the IP/Port/Virtual Router column of Server1/2 and type a new value.

5. Select the check box in the **Enable** column to enable this URL lookup server.
6. Click **OK** to save the settings.

Keyword Category

You can customize the keyword category and use it in the internet behavior control function.

After configuring a internet behavior control rule, the system will scan traffic according to the configured keywords and calculate the trust value for the hit keywords. The calculating method is: adding up the results of *times* * *trust value* of each keyword that belongs to the category. Then the system compares the sum with the threshold 100 and performs the following actions according to the comparison result:

- If the sum is larger than or equal to category threshold (100), the configured category action will be triggered;
- If more than one category action can be triggered and there is block action configured, the final action will be Block;
- If more than one category action can be triggered and all the configured actions are Permit, the final action will be Permit.

For example, a web content rule contains two keyword categories C1 with action block and C2 with action permit. Both of C1 and C2 contain the same keywords K1 and K2. Trust values of K1 and K2 in C1 are 20 and 40. Trust values of K1 and K2 in C2 are 30 and 80.

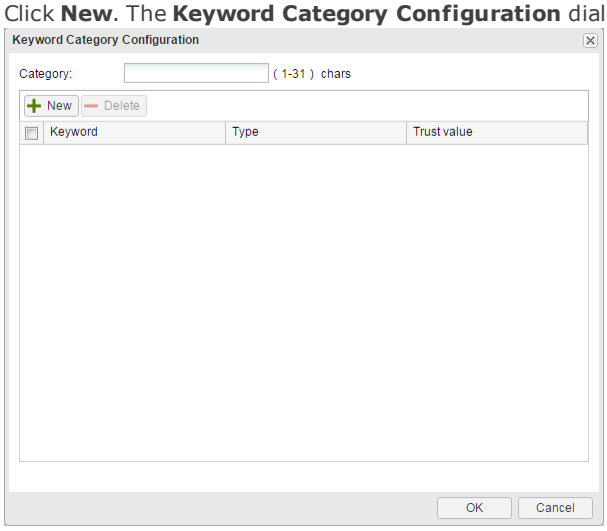
If the system detects 1 occurrence of K1 and K2 each on a web page, then C1 trust value is 20*1＋40*1=60<100, and C2 trust value is 30*1+80*1=110>100. As a result, the C2 action is triggered and the web page access is permitted.

If the system detects 3 occurrences of K1 and 1 occurrence of K2 on a web page, then C1 trust value is 20*3+40*1-1=100, and C2 trust value C2 is 30*3+80*1=170>100. Conditions for both C1 and C2 are satisfied, but the block action for C1 is triggered, so the web page access is denied.

Configuring a Keyword Category

To configure a keyword category:

1. Select **Object > Data Security>Content Filter> Web Content/Web Posting/Email Filter**.
2. At the top-right corner, Select **Configuration > Keyword Category**. The Keyword Category dialog appears.
3. Click **New**. The **Keyword Category Configuration** dialog appears.



4. Type the category name.

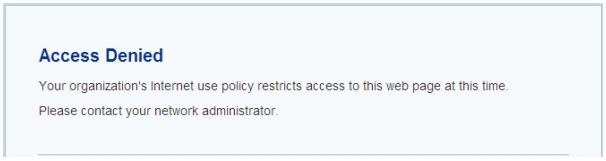
5. Click **New**. In the slide area, specify the keyword, character matching method (simple/regular expression), and trust value (100 by default).
6. Click **Add** to add the keyword to the list below.
7. Repeat the above steps to add more keywords.
8. To delete a keyword, select the keyword you want to delete from the list and click **Delete**.
9. Click **OK** to save your settings.

Warning Page

The warning page shows the user block information and user audit information.

Configuring Block Warning

If the internet behavior is blocked by the internet behavior control function, the Internet access will be denied. The information of Access Denied will be shown in your browser, and some web surfing rules will be shown to you on the warning page at the same time. See the picture below:

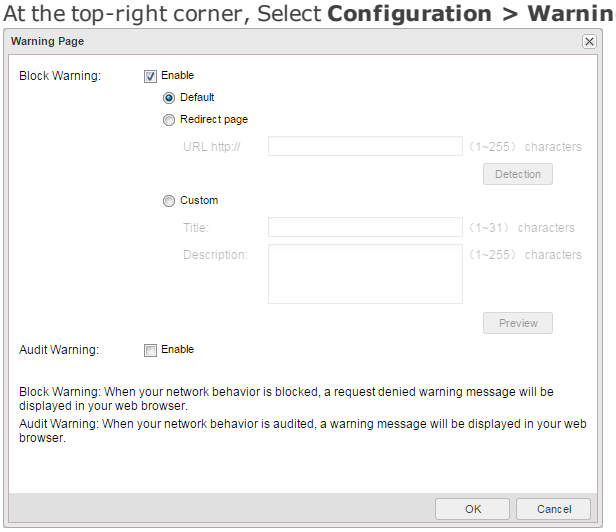


After enabling the block warning function, block warning information will be shown in the browser when one of the following actions is blocked:

- Visiting the web page that contains a certain type of keyword category
- Posting information to a certain type of website or posting a certain type of keywords
- HTTP actions of Connect, Get, Put, Head, Options, Post, and Trace. HTTP binary file download, such as .bat, .com. Downloading ActiveX and Java Applet.

The block warning function is enabled by default. To configure the block warning function:

1. Click **Object > Data Security>Content Filter> Web Content/Web Posting/Email Filter/HTTP/FTP Control**.
2. At the top-right corner, Select **Configuration > Warning Page**. The Warning Page dialog appears.



3. In the Block Warning section, select **Enable**.

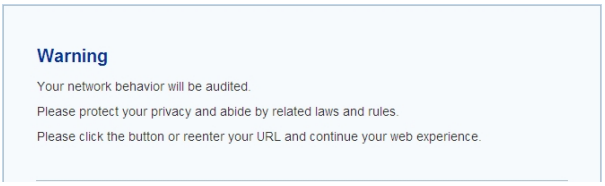
4. **Configure the display information in the blocking warning page.**

Option	Description
Default	Use the default blocking warning page as shown above.
Redirect page	Redirect to the specified URL. Type the URL in the **URL http://** box. You can click Detection to verify whether the URL is valid.
Custom	Customize the blocking warning page. Type the title in the **Title** box and the description in the **Description** box. You can click **Preview** to preview the blocking warning page.

5. Click **OK** to save the settings.

Configuring Audit Warning

After enabling the audit warning function, when your internet behavior matches the configured internet behavior rules, your HTTP request will be redirected to a warning page, on which the audit and privacy protection information is displayed. See the picture below:



The audit warning function is disabled by default. To configure the audit warning function:

1. Select **Object > Data Security>Content Filter> Web Content/Web Posting/Email Filter/HTTP/FTP Control**.
2. At the top-right corner, Select **Configuration > Warning Page**. The Warning Page dialog appears.
3. In the Audit Warning section, select **Enable**.
4. Click **OK** to save the settings.

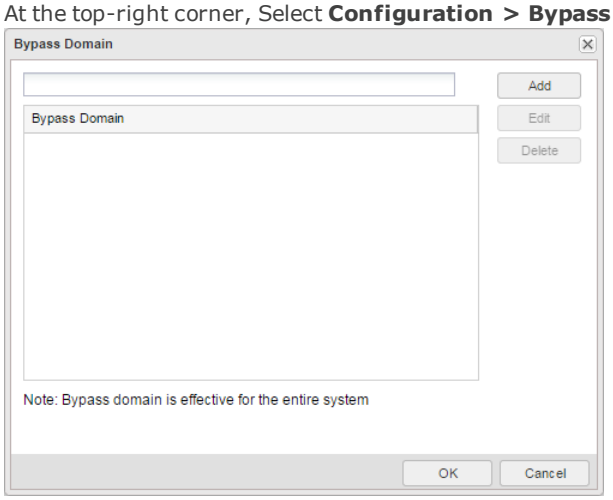
Bypass Domain

Regardless of internet behavior control rules, requests to the specified bypass domains will be allowed unconditionally.

To configure a bypass domain:

1. Select **Object > Data Security>Content Filter> Web Content/Web Posting/Email Filter/HTTP/FTP Control**.

2. At the top-right corner, Select **Configuration > Bypass Domain**. The Bypass Domain dialog appears.



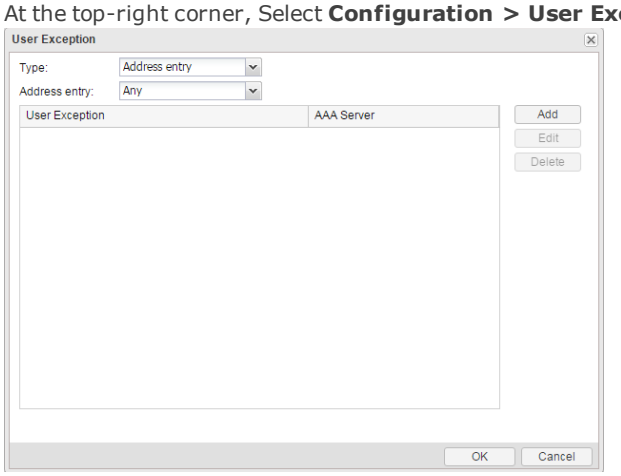
3. In the text box, type the domain name.
4. Click **Add**. The domain name will be added to the system and displayed in the bypass domain list.
5. Click **OK** to save the settings.

User Exception

The user exception function is used to specify the users who will not be controlled by the internet behavior control rules. The system supports the following types of user exception: IP, IP range, role, user, user group, and address entry.

To configure the user exception:

1. Select **Object > Data Security>Content Filter> Web Content/Web Posting/Email Filter/HTTP/FTP Control**.
2. At the top-right corner, Select **Configuration > User Exception**. The User Exception dialog appears.



3. Select the type of the user from the **Type** drop-down list.
4. Configure the corresponding options.
5. Click **Add**. The user will be added to the system and displayed in the user exception list.
6. Click **OK** to save the settings.

File Filter

The file filter function checks the files transported through HTTP, FTP, SMTP, POP3 protocols and control them according to the file filter rules.

- Be able to check and control the files transported through GET and POST methods of HTTP, FTP, SMTP, and POP3.
- Support file size, file type, and file name filter conditions. Do not support the file size filter condition for FTP.
- Support block, log, and permit actions.

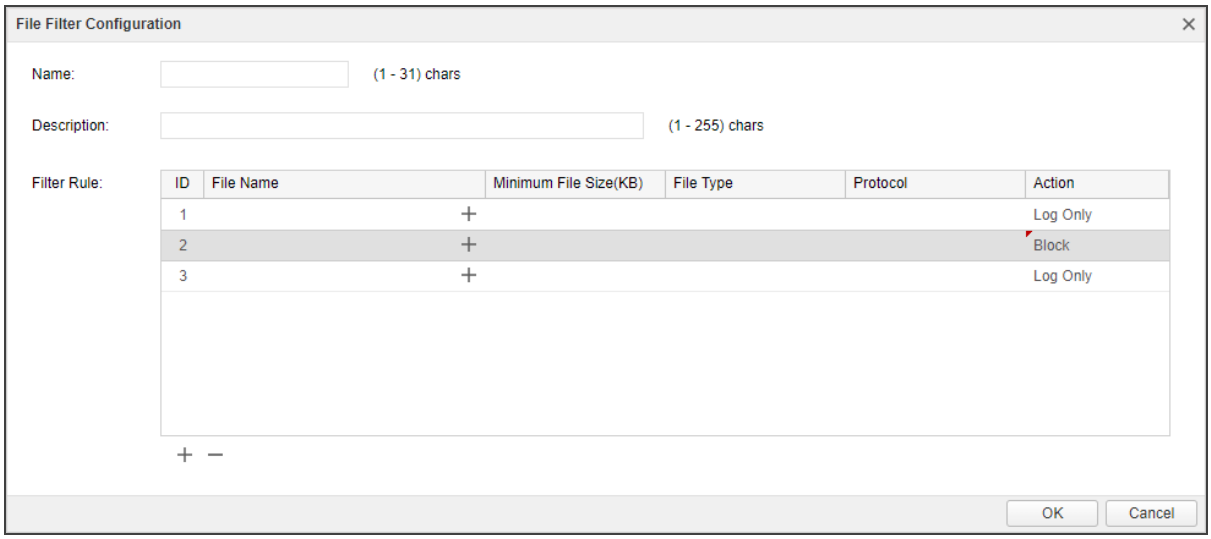
After you bind the file filter profile to a policy rule, the system will process the traffic that matches the rule according to the profile.

Creating File Filter Rule

Use the file filter rule to specify the protocol that you want to check, the filter conditions, and the actions.

To create a file filter rule:

1. Select **Object > Data Security > File Filter**.
2. Click **New**.



3. **In the dialog box, enter values.**

Option	Description
Name	Specifies the name of the file filter rule.
Description	Specifies the description of the file filter rule.
Filter Rule	
ID	The ID of file filter rule item. Each file filter rule contains 3 items. If one filter rule item is configured with the block action and the file happens to match this rule, then the system will block the uploading/downloading of this file.
File Name	Specifies the file name. The value ranges from 1 to 255 characters. You can specify up to 32 file names. If there is no wildcard in this specified name, then the transported file whose name is the same as the specfied name will trigger the actions. If the asterisk (*) appears in this specified name, then the transported file whose name contains the part that followes the asterisk will trigger the actions.
Minimum File Size (KB)	Specifies the file size. The value ranges from 1 to 512,000. The unit KB.
File Type	Specifies the file type. Click on the column's cells and select from the drop-down menu. You can specify more than one file types. To control the file type that not supported, you can use the UNKNOWN type. When the transmitted file is a particular type, the system will trigger the actions. The file filter function can identify the following file types: 7Z, AI, APK, ASF, AVI, BAT, BMP, CAB, CATPART, CDR, CIN, CLASS, CMD, CPL, DLL, DOC, DOCX, DPX, DSN, DWF, DWG, DXF, EDIT, EMF, EPS, EPUB, EXE, EXR, FLA, FLV, GDS, GIF, GZ, HLP, HTA, HTML, IFF, ISO, JAR, JPG, KEY, LNK, LZH, MA, MB, MDB, MDI, MIF, MKV, MOV, MP3, MP4, MPEG, MPKG, MSI, NUMBERS, OCX, PAGES, PBM, PCL, PDF, PGP, PIF, PL, PNG, PPT, PPTX, PSD, RAR, REG, RLA, RMVB, RPF, RTF, SGI, SH, SHK, STP, SVG, SWF, TAR, TDB, TIF, TORRENT, TXT, VBE, WAV, WEBM, WMA, WMF, WMV, WRI, WSF, XLS, XLSX, XML, XPM, ZIP, UNKNOWN
Protocol	Specifies the protocols. http-get represents to check the files transported through the GET method of HTTP. http-post represents to check the files transported through the POST method of HTTP. ftp represents to check the files transported through FTP. smtp represents to check the files transported through SMTP. pop3 represents to check the files transported through POP3. You can specify more than one protocol types. This option is required.
Action	Specifies the action to control the files that matches the filter conditions. You can specify block and log at the same time. This option is required.

4. Click **OK**.

Content Filter

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

Includes:

- "Web Content" on Page 260: Controls the network behavior of visiting the webpages that contain certain keywords, and log the actions.
- "Web Posting" on Page 263: Controls the network behavior of posting on websites and posting specific keywords, and logs the posting action and posted content.
- "Email Filter" on Page 266: Controls and audit SMTP mails :
  - Control and audit all the behaviors of sending emails.
  - Control and audit the behaviors of sending emails that contain specific sender, recipient, keyword or attachment.
- "HTTP/FTP Control" on Page 269:Controls and audits the actions of HTTP and FTP applications:
  - FTP methods, including Login, Get, and Put.
  - HTTP methods, including Connect, Get, Put, Head, Options, Post, and Trace.

Web Content

The web content function is designed to control the network behavior of visiting the websites that contain certain keywords. For example, you can configure to block the access to website that contains the keyword "gamble", and record the access action and website information in the log.

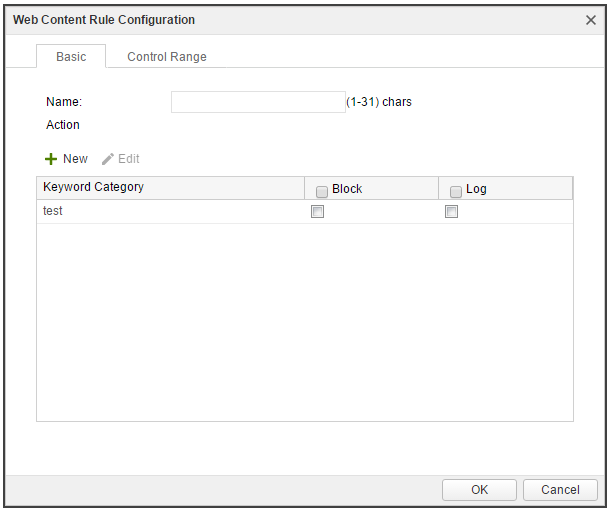
Configuring Web Content

Configuring Web Content contains two parts:

- Create a Web Content rule
- Bind a Web Content rule to a security zone or policy rule

Part 1: Creating a web content rule

1. Select **Object > Data Security>Content Filter>Web Content**.
2. Click **New**.



In the Web Content Rule Configuration dialog box, enter values.

Option	Description
Name	Rule Name
Action	Defines the action when a keyword is matched. • New: Creates new keyword categories. For more information about keyword category, see "Configuring Data Security Objects" on Page 249. • Edit: Edits selected keyword category. • Keyword category: Shows the name of configured keyword categories. • Block: Select the check box to block the web pages containing the corresponding keywords. • Log: Select the check box to record log messages when visiting the web pages containing the corresponding keywords. • Record contents: Select the check box to record the keyword context. This option is available only when the device has a storage media (SD card, U disk, or storage module provided by Hillstone) with the NBC license installed.
Control Range	Specify the coverage of this rule. By default, the rule applies to all website. 1. Click **Control Range**. 2. Select or unselect the websites you want to monitor and control. 3. Click **OK**.

3. Click **OK**.

Part 2: Binding a Web Content rule to a security zone or security policy rule

The Web content configurations are based on security zones or policies.

- If a security zone is configured with the Web content function, the system will perform detection on the traffic that is destined to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the Web content function, the system will perform detection on the traffic that is destined to the policy rule you specified, and then response.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the Web content configurations in a destination zone is superior to that in a source zone if specified at the same time.

To realize the zone-based Web Content:

1. Create a zone. For more information about how to create, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Data Security tab.

3. Enable the threat protection you need, and select a Web content rules from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list below, to create a Web content rule, see Creating a Web content rule.
4. Click **OK** to save the settings.

To realize the policy-based Web content:

1. Configure a security policy rule. See "Configuring a Security Policy Rule" on Page 281.
2. In the Data Security tab, select the **Enable** check box of Web Content.
3. From the **Profile** drop-down list, select a Web Content rule. You can also click **Add Profile** to create a new Web Content rule.
4. Click **OK** to save the settings.

If necessary, you can configure some additional features by going to the right top corner and click **Configuration**.

Option	Description
Predefined URL DB	The predefined URL database includes dozens of categories and tens of millions of URLs and you can use it to specify the URL category and URL range for the URL category/Web posting functions.
User-defined URL DB	The user-defined URL database is defined by yourself and you can use it to specify the URL category and URL range for the URL category/Web posting functions.
URL Lookup	Use the URL lookup function to inquire URL information from the URL database.
Warning Page	• Block warning: When your network access is blocked, you will be prompted with a warning page in the Web browser. • Audit warning: When your network access is audited, you will be prompted with a warning page in the Web browser.
Bypass Domain	Domains that are not controlled by the internet behavior control rules.
User Exception	Users that are not controlled by the internet behavior control rules.

Note:

- To enusre you have the latest URL database, it is better to update your database first. Refer to "Configuring Data Security Objects" on Page 249.
- You can export logs to a designated destination. Refer to "Log Configuration" on Page 439.
- By default, a rule will immediately take effect after you click **OK** to complete configuration.

Viewing Monitored Results of Keyword Blocking in Web Content

If you have configured email filter with keyword blocking, you can view the monitored results of blocking those words.

Select **Monitor > Keyword Block > Web Content**, you will see the monitored results. For more about monitoring, refer to "Web Content" on Page 406.

Viewing Logs of Keyword Blocking in Web Content

To see the system logs of keyword blocking in web content, please refer to the "Content Filter Logs" on Page 437.

Web Posting

The web posting function can control the network behavior of posting on websites and posting specific keywords, and can log the posting action and posting content. For example, forbid the users to post information containing the keyword X, and record the action log.

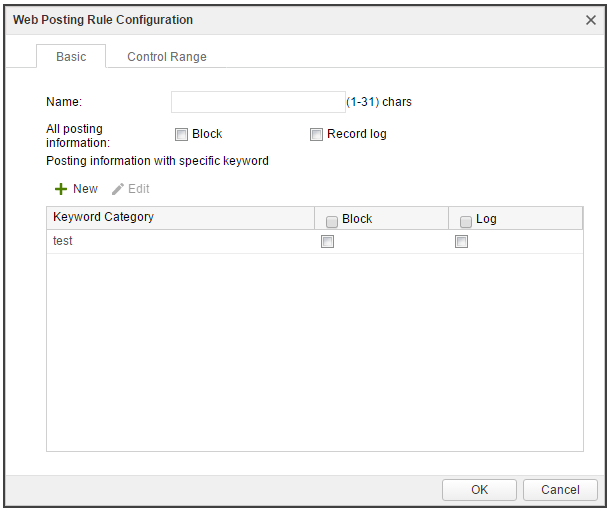
Configuring Web Posting

Configuring Web Posting contains two parts:

- Create a web posting rule
- Bind a web posting rule to a security zone or policy rule

Part 1: Creating a web posting rule

1. Select **Object > Data Security>Content Filter> Web Posting**.
2. Click **New**.



In the Web Posting Rule Configuration dialog, enter values.

Option	Description
Name	Specifies the rule name.
All posting information	The action applies to all web posting content. • Block: Select to block all web posting behaviors. • Record Log: Select to record all logs about web posting.
Posting information with specific keyword	Controls the action of posting specific keywords. The options are: • New: Creates new keyword categories. For more information about keyword category, see "Keyword Category" on Page 253. • Edit: Edits selected keyword category. • Keyword category: Shows the name of configured keyword categories. • Block: Blocks the posting action of the corresponding keywords. • Log: Records log messages when posting the corresponding keywords.
Control Range	Specify the coverage of this rule. By default, the rule applies to all website. 1. Click **Control Range**. 2. Select or unselect the websites you want to monitor and control. 3. Click **OK**.

3. Click **OK**.

Part 2: Binding a Web Posting rule to a security zone or security policy rule

The web posting configurations are based on security zones or policies.

- If a security zone is configured with the web posting function, the system will perform detection on the traffic that is destined to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the web posting function, the system will perform detection on the traffic that is destined to the policy rule you specified, and then response.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the web posting configurations in a destination zone is superior to that in a source zone if specified at the same time.

To realize the zone-based web posting:

1. Create a zone. For more information about how to create, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Data Security tab.

3. Enable the threat protection you need, and select a Web content rules from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list below, to create a Web content rule, see Creating a web posting rule.
4. Click **OK** to save the settings.

To realize the policy-based web posting:

1. Configure a security policy rule. See "Configuring a Security Policy Rule" on Page 281.
2. In the Data Security tab, select the **Enable** check box of web posting.
3. From the **Profile** drop-down list, select a web posting rule. You can also click **Add Profile** to create a new web posting rule.
4. Click **OK** to save the settings.

If necessary, you can configure some additional features by going to the right top corner and click **Configuration**.

Option	Description
Predefined URL DB	The predefined URL database includes dozens of categories and tens of millions of URLs and you can use it to specify the URL category and URL range for the URL category/Web posting functions.
User-defined URL DB	The user-defined URL database is defined by yourself and you can use it to specify the URL category and URL range for the URL category/Web posting functions.
URL Lookup	Use the URL lookup function to inquire URL information from the URL database.
Warning Page	• Block warning: When your network access is blocked, you will be prompted with a warning page in the Web browser. • Audit warning: When your network access is audited, you will be prompted with a warning page in the Web browser.
Bypass Domain	Domains that are not controlled by the internet behavior control rules.
User Exception	Users that are not controlled by the internet behavior control rules.

Note:

- To enusre you have the latest URL database, it is better to update your database first. Refer to "Configuring Data Security Objects" on Page 249.
- If there is an action conflict between setting for "all websites" and "specific keywords", when a traffic matches both rules, the "deny" action shall prevail.
- You can export logs to a designated destination. Refer to "Log Configuration" on Page 439.
- By default, a rule will immediately take effect after you click **OK** to complete configuration.

Viewing Monitored Results of Keyword Blocking in Web Posts

If you have configured web posting rule with keyword blocking, you can view the monitored results of blocking those words.

Select **Monitor > Keyword Block > Web Posting**, you will see the monitored results. For more about monitoring, refer to "Keyword Block" on Page 406.

Viewing Logs of Keyword Blocking in Web Posts

To see the system logs of keyword blocking in web posts, please refer to the "Content Filter Logs" on Page 437.

Email Filter

The email filter function is designed to control the email sending actions according to the sender, receiver, email content and attachment, and record the sending log messages. Both the SMTP emails and the web mails can be controlled.

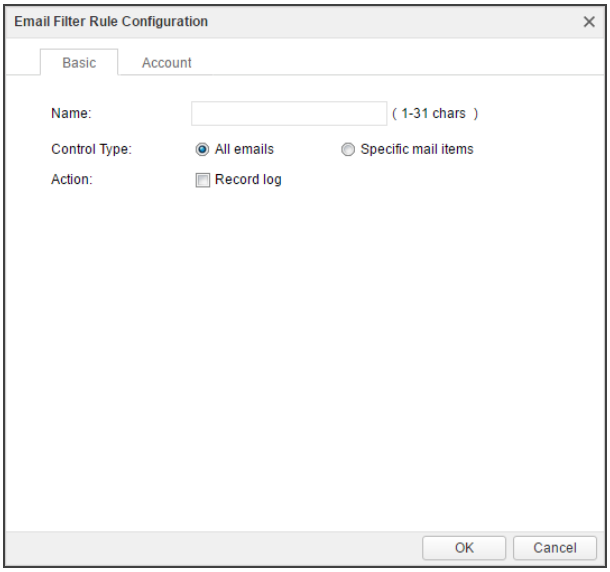
Configuring Email Filter

Configuring email filter contains two parts:

- Create an email filter rule
- Bind an email filter rule to a security zone or policy rule

Part 1: Creating an email filter rule

1. Select **Object > Data Security>Content Filter> Email Filter**.
2. Click **New**.



In the dialog box, enter values.

Option	Description
Name	Specifies the rule name.
Control Type	All emails - This option applies to all the sending emails. • Record Log - Select this check box if you want all emails to be logged.
	Specific mail items - This option applies to specific mail items. To configure the email sender: 1. Click **Sender**. 2. In the prompt, enter sender's email address. 3. Click **Add**.

Option	Description
	4. You may select to block the sender or keep a record. 5. Click **OK**. To configure the email receiver: 1. Click **Sender**. 2. In the prompt, enter email receiver's email address. 3. Click **Add**. 4. You may select to block the receiver or keep a record. 5. Click **OK**. To configure the email content keywords: 1. Click **email content**. 2. In the prompt, click **Add**. See the Keyword Category part in "Configuring Data Security Objects" on Page 249. 3. You may select to block the email containing keywords or keep a record. **Other emails**: Select an action for emails other than which are added above.
Account	
Exclusive Mailbox	To configure mail addresses that do not follow the regulations of email filter: 1. Click **Account**. 2. In the prompt, enter emails that do not obey email filter. 3. Click **Add**, and you can add more. 4. Click **OK**.

Part 2: Binding an Email filter rule to a security zone or security policy rule

The email filter configurations are based on security zones or policies.

- If a security zone is configured with the email filter function, the system will perform detection on the traffic that is destined to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the email filter function, the system will perform detection on the traffic that is destined to the policy rule you specified, and then response.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the email filter configurations in a destination zone is superior to that in a source zone if specified at the same time.

To realize the zone-based email filter:

1. Create a zone. For more information about how to create, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Threat Protection tab.
3. Enable the threat protection you need, and select an email filter rules from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list below, to create an email filter rule, see Creating an email filter rule.
4. Click **OK** to save the settings.

To realize the policy-based email filter:

1. Configure a security policy rule. See "Configuring a Security Policy Rule" on Page 281.
2. In the Protection tab, select the **Enable** check box of email filter.
3. From the **Profile** drop-down list, select an email filter rule. You can also click **Add Profile** to create a new email filter rule.
4. Click **OK** to save the settings.

If needed, you can also configure SSL proxy, keyword category, warning page, bypass domain and user exception.

To configure those feature, click **Configuration** on the right top corner of the Email Filter list page.

Option	Description
Keyword Category	Use the keyword category function to customize the keyword categories. You can use it to specify the keyword for the URL category/Web posting/email filter functions.
Warning Page	• Block warning: When your network access is blocked, you will be prompted with a warning page in the Web browser. • Audit warning: When your network access is audited, you will be prompted with a warning page in the Web browser.
Bypass Domain	Domains that are not controlled by the internet behavior control rules.
User Exception	Users that are not controlled by the internet behavior control rules.

Note:

- If an email filter rule has added all three of Audit/Block Sender, Receiver and email content, the rule will take effect when one of them is hit.
- You can export logs to a designated destination. Refer to "Log Configuration" on Page 439.
- By default, a rule will immediately take effect after you click **OK** to complete configuration.

Viewing Monitored Results of Email Keyword Blocking

If you have configured email filter with keyword blocking, you can view the monitored results of blocking those words.

Select **Monitor > Keyword Block > Email Content**, you will see the monitored results. For more about monitoring, refer to "Email Content" on Page 407.

Viewing Logs of Emails Keyword Blocking

To see the system logs of email's keywords, please refer to the "Content Filter Logs" on Page 437.

HTTP/FTP Control

The HTTP/FTP control function is designed to control and audit (record log messages) the actions of HTTP and FTP applications, including:

- Behavior control and audit of controlling the actions of Login, Get, and Put action in FTP;
- Behavior control and audit of controlling the actions of Connect, Get, Put, Head, Options, Post, Trace, Delete in HTTP.

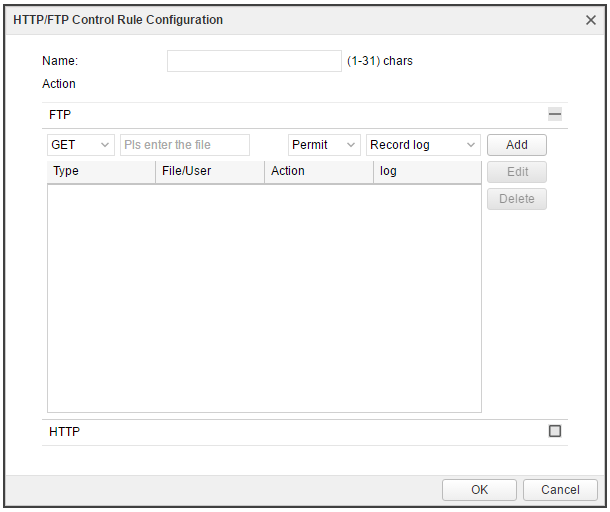
Configuring HTTP/FTP Control

Configuring HTTP/FTP behavior control contains two parts:

- Create an HTTP/FTP behavior control rule
- Bind an HTTP/FTP behavior control rule to a security zone or policy rule

Part 1: Creating an HTTP/FTP behavior control rule

1. Select **Object > Data Security>Content Filter> HTTP/FTP Control**.
2. Click **New**.



In the HTTP/FTP Control Rule Configuration dialog box, enter values.

Option	Description
Name	Specifies the rule name.
Action	
FTP	Controls the FTP methods, including Login, Get, and Put. Expand FTP, and configure the FTP control options. • From the first drop-down list, select the method to be controlled, it can be GET, PUT, or Login. • Type the file name (for the method of GET or PUT) or user name (for the method of Login) into the next box. • From the second drop-down list, select the action. It can be Block or Permit. • From the third drop-down list, specify whether to record the log messages. • Click **Add**. • Repeat Step 1 to 5 to add more control entries. To edit/delete a control entry, select the entry from the list, and then click **Edit** or **Delete**.
HTTP	Controls the HTTP methods, including Connect, GET, PUT, Head, Options, Post, Trace, and Delete. Expand HTTP, and configure the HTTP control options. • From the first drop-down list, select the method to be controlled, it can be Connect, GET, PUT, Head, Options, Post, Trace, or Delete. • Type the domain name into the next box. • From the second drop-down list, select the action. It can be Block or Permit. • From the third drop-down list, specify whether to record the log messages. • Click Add. • Repeat Step 1 to 5 to add more control entries. To edit/delete a control entry, select the entry from the list, and then click **Edit** or **Delete**.

3. Click **OK**.

Part 2: Binding a HTTP/FTP behavior control rule to a security zone or security policy rule

The HTTP/FTP behavior control configurations are based on security zones or policies.

- If a security zone is configured with the HTTP/FTP behavior control function, the system will perform detection on the traffic that is destined to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the HTTP/FTP behavior control function, the system will perform detection on the traffic that is destined to the policy rule you specified, and then response.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the HTTP/FTP behavior control configurations in a destination zone is superior to that in a source zone if specified at the same time.

To realize the zone-based HTTP/FTP behavior control:

1. Create a zone. For more information about how to create, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Data Security tab.
3. Enable the threat protection you need, and select an email filter rules from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list below, to create a HTTP/FTP behavior control rule, see Creating a HTTP/FTP behavior control rule.
4. Click **OK** to save the settings.

To realize the policy-based HTTP/FTP behavior control:

1. Configure a security policy rule. See "Configuring a Security Policy Rule" on Page 281.
2. In the Data Security tab, select the **Enable** check box of HTTP/FTP behavior control.
3. From the **Profile** drop-down list, select a HTTP/FTP behavior control rule. You can also click **Add Profile** to create a new HTTP/FTP behavior control rule.
4. Click **OK** to save the settings.

If necessary, you can configure some additional features by going to the right top corner and click **Configuration**.

Option	Description
Warning Page	• Block warning: When your network access is blocked, you will be prompted with a warning page in the Web browser. • Audit warning: When your network access is audited, you will be prompted with a warning page in the Web browser.
Bypass Domain	Domains that are not controlled by the internet behavior control rules.
User Exception	Users that are not controlled by the internet behavior control rules.

Note:
- You can export logs to a designated destination. Refer to "Log Configuration" on Page 439.
- By default, a rule will immediately take effect after you click **OK** to complete configuration.

Viewing Logs of HTTP/FTP Behavior Control

To see the system logs of HTTP/FTP behavior control, please refer to the "Content Filter Logs" on Page 437.

Network Behavior Record

Network behavior record function audits the IM applications behaviors and record log messages for the access actions, includes:

- Audits the QQ, WeChat and sinaweibo user behaviors.
- Log the access behaviors.

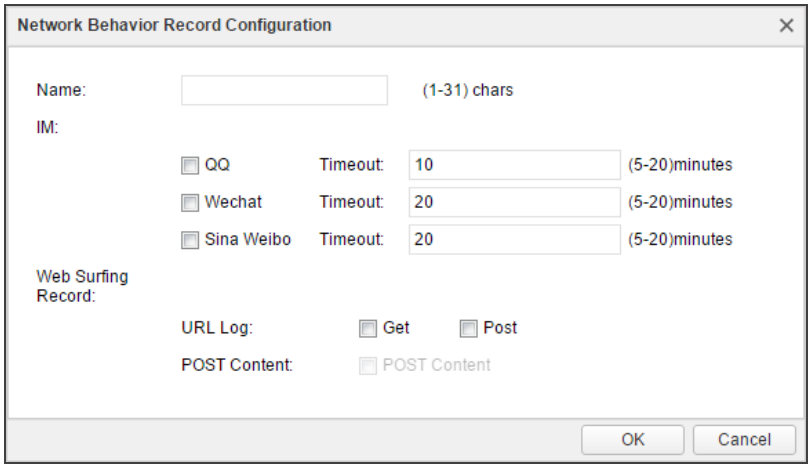
Configuring Network Behavior Recording

Configuring network behavior record contains two parts:

- Create a network behavior record rule
- Bind a network behavior record rule to a security zone or policy rule

Part 1: Creating a NBR rule

1. Select **Object > Data Security>Network Behavior Record**.
2. Click **New**.



In the Network Behavior Record Configuration dialog box, enter values.

Option	Description
Name	Rule Name
IM	
QQ	To audits the QQ behavior. 1. Select the **QQ** checkbox. 2. Timeout: Specifies the timeout value. The unit is minute. The default value is 10. During the timeout period, the IM user traffic of the same UID will not trigger the new logs and after the timeout reaches, it will trigger new logs.
WeChat	To audits the WeChat behavior. 1. Select the **Wechat** checkbox. 2. Timeout: Specifies the timeout value. The unit is minute. The default value is 20. During the timeout period, the IM user traffic of the same UID will not trigger the new logs and after the timeout reaches, it will trigger new logs.
Sina Weibo	To audits the sina weibo behavior. 1. Select the **Sina Weibo** checkbox 2. Timeout: Specifies the timeout value. The unit is minute. The default value is 20. During the timeout period, the IM user traffic of the same UID will not trigger the new logs and after the timeout reaches, it will trigger new logs.
Web Surfing Record	
URL Log	logs the GET and POST methods of HTTP. • Get: Records the logs when having GET methods. • Post: Records the logs when having POST methods.
POST Content	Post Content: Records the posted content.

3. Click **OK**.

Part 2: Binding a network behavior record rule to a security zone or security policy rule

The network behavior record configurations are based on security zones or policies.

- If a security zone is configured with the network behavior record function, the system will perform detection on the traffic that is destined to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the network behavior record function, the system will perform detection on the traffic that is destined to the policy rule you specified, and then response.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the network behavior record configurations in a destination zone is superior to that in a source zone if specified at the same time.

To realize the zone-based network behavior record:

1. Create a zone. For more information about how to create, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Data Security tab.
3. Enable the threat protection you need, and select a network behavior record rules from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list below, to create a network behavior record rule, see Creating a network behavior record rule.
4. Click **OK** to save the settings.

To realize the policy-based network behavior record:

1. Configure a security policy rule. See "Configuring a Security Policy Rule" on Page 281.
2. In the Data Security tab, select the **Enable** check box of network behavior record.
3. From the **Profile** drop-down list, select a network behavior record rule. You can also click **Add Profile** to create a new network behavior record rule.
4. Click **OK** to save the settings.

Note:
- You can export logs to a designated destination. Refer to "Log Configuration" on Page 439
- By default, a rule will immediately take effect after you click **OK** to complete configuration

Viewing Logs of Network Behavior Recording

To see the logs of network behavior recording, please refer to the "Network Behavior Record Logs" on Page 438.

End Point Protection

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

The endpoint security control center is used to monitor the security status of each access endpoint and the system information of the endpoint.

When the end point protection function is enabled, the device can obtain the endpoint data monitored by the endpoint security control center by interacting with it, and then specify the corresponding processing action according to the security status of endpoint, so as to control the endpoint network behavior.

Note:

- At present, end point protection function only supports linkage with "JIANGMIN" endpoint security control center.
- End point protection is controlled by license. To use end point protection, apply and install the EPP license.

Related Topics:

- "Configuring End Point Protection" on Page 276
- "Configuring End Point Security Control Center Parameters" on Page 279
- "End Point Detect" on Page 394
- "EPP Logs" on Page 435

Configuring End Point Protection

This chapter includes the following sections:

- Preparation for configuring end point protection function.
- Configuring end point protection function.

Preparing

Before enabling end point protection, make the following preparations:

1. Make sure your system version supports end point protection.
2. Import an EPP license and reboot.

Configuring End Point Protection Function

The end point protection configurations are based on security zones or policies.

To realize the zone-based end point protection, take the following steps:

1. Create a zone. For more information, refer to "Security Zone" on Page 9.
2. In the **Zone Configuration** dialog, select **End Point Protection** tab.
3. Enable the end point protection you need and select an end point protection rule from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list. To creat an endpoint protection rule, see Configuring End Point Protection Rule.
4. Click **OK** to save the settings.

To realize the policy-based endpoint protection, take the following steps:

1. Create a security policy rule. For more information, refer to "Security Policy" on Page 281.
2. In the Policy Configuration dialog box, select the Protection tab.
3. Select the **Enable** check box of **End Point Protection**. Then select an endpoint protection rule from the Profile drop-down list, or you can click **Add Profile** from the Profile drop-down list to create an end point protection rule. For more information, see Configuring End Point Protection Rule.
4. Click **OK** to save the settings.

Note: When the zone and policy bind the same end point protection rule, the priority is policy > zone.

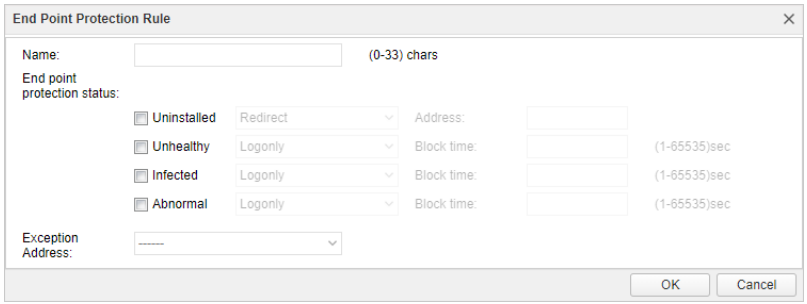
Configuring End Point Protection Rule

System has two default end point protection rules: **predef_epp** and **no_epp**.

- **predef_epp**: Execute the **Logonly** action for the endpoint whose status is "Uninstall" and "Unhealthy". Execute the **Block** action for the endpoint whose status is "Infected" and "Abnormal", and the block time is 60s.
- **no_epp**:No protective action is executed on all endpoints by default.

To configure an end point protection rule, take the following steps:

1. Click **Object**> **End Point Protection** > **Profile**.
2. Click **New**.



In End Point Protection Rule dialog, enter the end point protection rule configurations.

Option	Description
Name	Specifies the rule name.

End Point Protection Status	Specifies the protection action corresponding to the endpoint status.
	• Uninstalled: Specifies the protection action for the endpoint which doesn't install an anti-virus client. Select the **Uninstalled** check box, and select the protection action in the drop-down list.
	  • Redirect - Redirects the endpoint to the specified URL. Enter the URL in the **Address** text box.
	  • Logonly - System will pass traffic and record logs only.
	  • Block - Block the endpoint connection, and specifies the block time in the **Block time** text box.
	• Unhealthy: Specifies the protection action for the unhealthy endpoint. Select the **Unhealthy** check box, and select the protection action in the drop-down list.
	  • Logonly - System will pass traffic and record logs only.
	  • Block - Block the endpoint connection, and specifies the block time in the **Block time** text box.
	• Infected: Specifies the protection action for the infected endpoint. Select the **Infected** check box, and select the protection action in the drop-down list.
	  • Logonly - System will pass traffic and record logs only.
	  • Block - Block the endpoint connection, and specifies the block time in the **Block time** text box.
	• Abnormal: Specifies the protection action for the abnormal endpoint. Select the **Abnormal** check box, and select the protection action in the drop-down list.
	  • Logonly - System will pass traffic and record logs only.
	  • Block - Block the endpoint connection, and specifies the block time in the **Block time** text box.

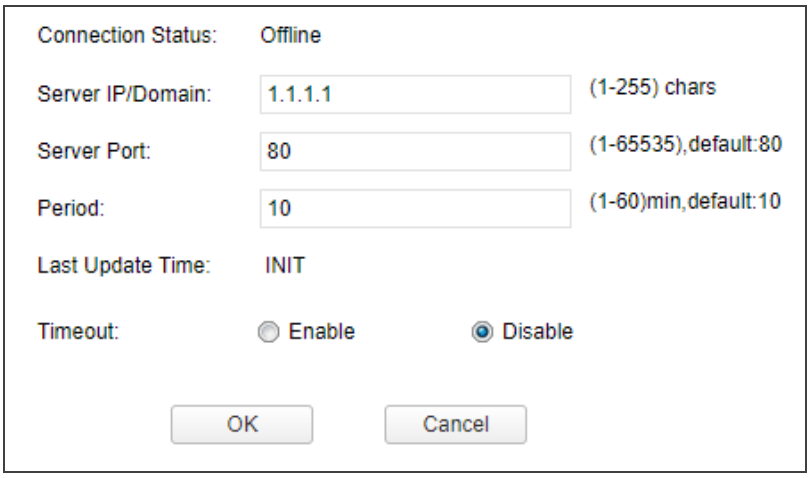
Exception Address	The exception address is not controlled by the end point protection rule. Select the address book name in the drop down list.

Option	Description
	 **Note:** Before selecting the exception address, you need to add the exception endpoint address to the address book. For configuration, see "Address" on Page 202.

3. Click **OK** to save the settings.

Configuring End Point Security Control Center Parameters

Click **Object > End Point Protection> Configuration** to configure the endpoint security control center parameters.



Option	Description
Connection Status	Display the endpoint security control center server connection status, including online and offline.
Server IP/Domain	Specifies the address or domain name of the endpoint security control center server. The range is 1 to 255 characters.
Server Port	Specifies the port of the endpoint security control center server. The range is 1 to 65535.
Period	Specifies the synchronization period of endpoint data information. The range is 1 to 60 minutes. The default value is 10 minutes.
Last Update Time	Displays the last time to synchronize endpoint data information.
Time	• Enable: After the connection of the endpoint security control center is disconnected, the endpoint data information that the system has been synchronized continues to take effect and can continue to be used. • Disable: After the endpoint security control center is disconnected, the endpoint data information that the system has synchronized is invalid, and the synchronous endpoint data information will be cleared. By default, the timeout entry is invalid.

Chapter 8 Policy

The Policy module provides the following functions:

- Security policy: Security policy the basic function of devices that are designed to control the traffic forwarding between security zones/segments. By default all traffic between security zones/segments will be denied.
- NAT: When the IP packets pass through the devices or routers, the devices or routers will translate the source IP address and/or the destination IP address in the IP packets.
- QoS: QoS is used to provide different priorities to different traffic, in order to control the delay and flapping, and decrease the packet loss rate. QoS can assure the normal transmission of critical business traffic when the network is overloaded or congested.
- Session limit: The session limit function limits the number of sessions and controls the session rate to the source IP address, destination IP address, specified IP address, service, or role/user/user group, thereby protecting from DoS attacks and control the bandwidth of applications, such as IM or P2P.
- Internet behavior control: The Internet behavior control allows you to flexibly configure control rules to comprehensively control and audit (by behavior logs and content logs) on user network behavior.
- Global blacklist: After adding the IP addresses or services to the global blacklist, system will perform the block action to the IP address and service until the block duration ends.

Security Policy

Security policy is the basic function of devices that is designed to control the traffic forwarding between security zones/segments. Without security policy rules, the devices will deny all traffic between security zones/segments by default. After configuring the security policy rule, the device can identify what traffic between security zones or segments will be permitted, and the others will be denied.

The basic elements of policy rules:

- The source zone and address of the traffic
- The destination zone and address of the traffic
- The service type of the traffic
- Actions that the devices will perform when processing the specific type of traffic, including Permit, Deny, Tunnel, From tunnel, WebAuth, and Portal server.

Generally a security policy rule consists of two parts: filtering conditions and actions. You can set the filtering conditions by specifying traffic's source zone/address, destination zone/address, service type, and user. Each policy rule is labeled with a unique ID which is automatically generated when the rule is created. You can also specify a policy rule ID at your own choice. All policy rules in system are arranged in a specific order. When traffic flows into a device, the device will query for policy rules by turn, and processes the traffic according to the first matched rule.

The max global security policy rule numbers may vary in different models.

Security policy supports IPv4 and IPv6 address. If IPv6 is enabled, you can configure IPv6 address entry for the policy rule.

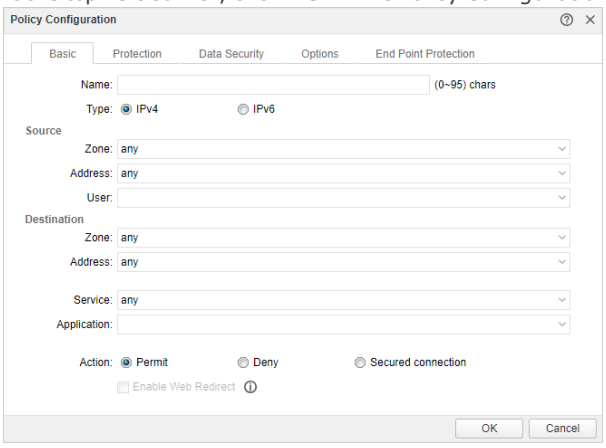
This section contains the following contents:

- Configure a security policy rule
- View and search the security policy rules
- Manage the security policy rules: enable/disable a policy rule, clone a policy rule, adjust security rule position, configure default action, view and clear policy hit count, hit count check, and rule redundancy check.

Configuring a Security Policy Rule

To configure a security policy rule, take the following steps:

1. Select **Policy > Security Policy**.
2. At the top-left corner, click **New**. The Policy Configuration dialog box will appear.



In the Basic tab, configure the corresponding options.

Option	Description
Type	Select the IP type, including IPv4 or IPv6. Only the IPv6 firmware can configure the IPv6 type IP. If IPv6 is selected, all of the IP/netmask, IP range, and address entry should be configured in the IPv6 format.
Source Information	
Zone	Specifies a source zone.
Address	Specifies the source addresses. 1. Select an address type from the **Address** drop-down list. 2. Select or type the source addresses based on the selected type. 3. Click to add the addresses to the right pane. 4. After adding the desired addresses, click the blank area in this dialog box to complete the source address configuration. You can also perform other operations: • When selecting the **Address Book** type, you can click **Add** to create a new address entry. • The default address configuration is any. To restore the configuration to this default one, select the **any** check box.
User	Specifies a role, user or user group for the security policy rule. 1. From the **User** drop-down menu, select the AAA server where the users and user groups reside. To specify a role, select **Role** from the **AAA Server** drop-down list. 2. Based on the type of AAA server, you can execute one or more actions: search a user/user group/role, expand the user/user group list, enter the name of the user/user group. 3. After selecting users/user groups/roles, click to add the them to the right pane. 4. After adding the desired objects, click the blank area in this dialog box to complete the user configuration.
Destination	
Zone	Specifies a destination zone.
Address	Specifies the destination addresses. 1. Select an address type from the **Address** drop-down list. 2. Select or type the destination addresses based on the selected type. 3. Click to add the addresses to the right pane. 4. After adding the desired addresses, click the blank area in this dialog box to complete the destination address configuration. You can also perform other operations: • When selecting the **Address Book** type, you can click **Add** to create a new address entry. • The default address configuration is any. To restore the con-

Option	Description
	figuration to this default one, select the **any** check box.
Other Information	
Service	Specifies a service or service group. 1. From the **Service** drop-down menu, select a type: Service, Service Group. 2. You can search the desired service/service group, expand the service/service group list. 3. After selecting the desired services/service groups, click to add them to the right pane. 4. After adding the desired objects, click the blank area in this dialog box to complete the service configuration. You can also perform other operations: • To add a new service or service group, click **Add**. • The default service configuration is any. To restore the configuration to this default one, select the **any** check box.
Application	Specifies an application/application group/application filters. 1. From the **Application** drop-down menu, you can search the desired application/application group/application filter, expand the list of applications/application groups/application filters. 2. After selecting the desired applications/application groups/application filters, click to add them to the right pane. 3. After adding the desired objects, click the blank area in this dialog box to complete the application configuration. You can also perform other operations: • To add a new application group, click **New AppGroup**. • To add a new application filter, click **New AppFilter**.
Action	
Action	Specifies an action for the traffic that is matched to the policy rule, including: • Permit - Select **Permit** to permit the traffic to pass through. • Deny - Select **Deny** to deny the traffic. • WebAuth - Performs Web authentication on the matched traffic. Select **WebAuth** from the drop-down list after selecting the **Security Connection** option, and then select an authentication server from the following drop-down list. • From tunnel (VPN) - For the traffic from a peer to local, if this option is selected, system will first determine if the traffic originates from a tunnel. Only such traffic will be permitted. Select **From tunnel (VPN)** from the drop-down list after selecting the **Security Connection** option, and then select a tunnel from the following drop-down list.

Option	Description
	• Tunnel (VPN) - For the traffic from local to a peer, select this option to allow the traffic to pass through the VPN tunnel. Select **Tunnel (VPN)** from the drop-down list after selecting the **Security Connection** option, and then select a tunnel from the following drop-down list. • Portal server - Performs portal authentication on the matched traffic. Select **Portal server** from the drop-down list after selecting the **Security Connection** option, and then type the URL address of the portal server.
Enable Web Redirect	Enable the Web redirect function to redirect the HTTP request from clients to a specified page automatically. With this function enabled, system will redirect the page you are requesting over HTTP to a prompt page. 1. Select the **Enable Web Redirect** check box. 2. Type a redirect URL into the **Notification page URL** box. When using Web redirect function, you need to configure the Web authentication function. For more configurations, see "User Online Notification" on Page 291.

In the Protection tab, configure the corresponding options.

Option	Description
Antivirus	Specifies an antivirus profile. The combination of security policy rule and antivirus profile enables the devices to implement fine-grained application layer policy control.
IPS	Specifies an IPS profile. The combination of security policy rule and IPS profile enables the devices to implement fine-grained application layer policy control.
URL Filter	Specifies a URL filter profile. The combination of security policy rule and URL filter profile enables the devices to implement fine-grained application layer policy control.
Sandbox	Specifies a sandbox profile. The combination of security policy rule and sandbox profile enables the devices to implement fine-grained application layer policy control.
Botnet C&C Prevention	Specifies a botnet C&C prevention profile. The combination of security policy rule and botnet C&C prevention profile enables the devices to implement fine-grained application layer policy control.

In the Data Security tab, configure the corresponding options.

Option	Description
File Filter	Specifies a file filter profile. The combination of security policy rule and file filter profile enables the devices to implement fine-grained application layer policy control.
Content Filter	• Web Content: Specifies a web content profile. The combination of security policy rule and Web Content profile enables the devices to implement fine-grained application layer policy control. • Web Posting: Specifies a web posting profile. The combination of security policy rule and web posting profile enables the devices to implement fine-grained application layer policy control.

Option	Description
	• Email Filter: Specifies an email filter profile. The combination of security policy rule and email filter profile enables the devices to implement fine-grained application layer policy control. • HTTP/FTP Control: Specifies a HTTP/FTP control profile. The combination of security policy rule and HTTP/FTP control profile enables the devices to implement fine-grained application layer policy control.
Network Behavior Record	Specifies a NBR profile. The combination of security policy rule and NBR profile enables the devices to implement fine-grained application layer policy control.

In the Options tab, configure the corresponding options.

Option	Description
Schedule	Specifies a schedule when the security policy rule takes effect. Select a desired schedule from the **Schedule** drop-down list. This option supports fuzzy search. After selecting the desired schedules, click the blank area in this dialog box to complete the schedule configuration. To create a new schedule, click **New Schedule**.
QoS	Add the QoS tag to the matched traffic by typing the value into the box, which is used to control the traffic combined with the QoS. For more information about QoS configuration, see "Pipes" on Page 297.
Log	You can log policy rule matching in the system logs according to your needs. • For the policy rules of Permit, logs will be generated in two conditions: the traffic that is matched to the policy rules starts and ends its session. • For the policy rules of Deny, logs will be generated when the traffic that is matched to the policy rules is denied. Select one or more check boxes to enable the corresponding log types. • Deny - Generates logs when the traffic that is matched to the policy rules is denied. • Session start - Generates logs when the traffic that is matched to the policy rules starts its session. • Session end - Generates logs when the traffic that is matched to the policy rules ends its session.
SSL Proxy	Specifies a SSL proxy profile. The combination of security policy rule and SSL proxy profile enables the devices to decrypt the HTTPS traffic.
Position	Select a rule position from the Position drop-down list. Each policy rule is labeled with a unique ID or name. When traffic flows into a device, the device will query for the policy rules by turn, and processes the traffic according to the first matched rule. However, the policy rule ID is not related to the matching sequence during the query. The sequence displayed in policy rule list is the query sequence for policy rules. The rule position can be an absolute position, i.e., at the top or bottom, or a relative position, i.e., before or after an ID or a name.
Description	Type descriptions into the **Description** box.

In the End Point Protection tab, configure the corresponding options.

Option	Description
End Point Protection	Specifies an end point protection profile. The combination of security policy rule and end point protection profile enables the devices to implement fine-grained application layer policy control.

3. Click **OK** to save your settings.

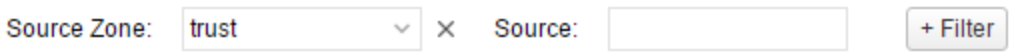
Viewing and Searching Security Policy Rules

View the security policy rules in the policy rule list.

- Each column displays the corresponding configurations.
- Click the button under Session column in the Policy list, and then the Session Detail dialog box will appear. You can view the current session status of the selected policy.
- Hover over your mouse on the configuration in a certain column. Then based on the configuration type, the WebUI displays either the icon or the detailed configurations.
  - You can view the detailed configurations directly.
  - You can click the icon. Based on the configuration type, the WebUI displays **Filter** or **Detail**. Click **Detail** to see the detailed configurations. Click **Filter** to all of the policy rules that have the same configuration as the one you are hovering over with your mouse.

Use the Filter to search for the policy rules that match the filter conditions.

1. Click **Policy > Security Policy**.
2. At the top-right corner, click **Filter**. Then a new row appears at the top.
3. Click **+Filter** to add a new filter condition. Then select a filter condition from the drop-down menu and enter a value.
4. Press **Enter** to search for the policy rules that matches the filter conditions.
5. Repeat the above two steps to add more filter conditions. The relationship between each filter condition is **AND**.
6. To delete a filter condition, hover your mouse on that condition and then click the icon. To close the filter, click the icon on the right side of the row.



Save the filter conditions.

1. After adding the filter conditions, click the **+ Filter** after the next arrow, in the drop-down menu, click + Save Filter.
2. Specifies the name of the filter condition to save, the maximum length of name is 32 characters, and the name supports only Chinese and English characters and underscores.
3. Click the **Save** button on the right side of the text box.

4. To use the saved filter condition, double click the name of the saved filter condition.
5. To delete the saved filter condition, click ✕ on the right side of the filter condition.

Note:
- You can add up to 20 filter conditions as needed.
- After the device has been upgraded, the saved filter condition will be cleared.

Managing Security Policy Rules

Managing security policy rules include the following matters: enable/disable a policy rule, clone a policy rule, adjust security rule position, configure default action, view and clear policy hit count, hit count check, and rule redundancy check.

Enabling/Disabling a Policy Rule

By default the configured policy rule will take effect immediately. You can terminate its control over the traffic by disabling the rule.

To enable/disable a policy rule:

1. Select **Policy > Security Policy**.
2. Select the security policy rule that you want to enable/disable.
3. Click **More**, and then select **Enable** or **Disable** to enable or disable the rule.

The disabled rule will not display in the list. Click **More > Show Disabled Policies** to show them.

Cloning a Policy Rule

To clone a policy rule, take the following steps:

1. Select **Policy > Security Policy**.
2. Select the security policy rule that you want to clone and click **Copy**.
3. Click **Paste**. In the pop-up, select the desired position. Then the rule will be cloned to the desired position.

Adjusting Security Policy Rule Position

To adjust the rule position, take the following steps:

1. Select **Policy > Security Policy**.
2. Select the check box of the security policy whose position will be adjusted.
3. Click **Move**.
4. In the pop-up menu, type the rule ID or name , and click **Before ID** , **After ID** , **Before Name** or **After Name**. Then the rule will be moved before or after the specified ID or name.

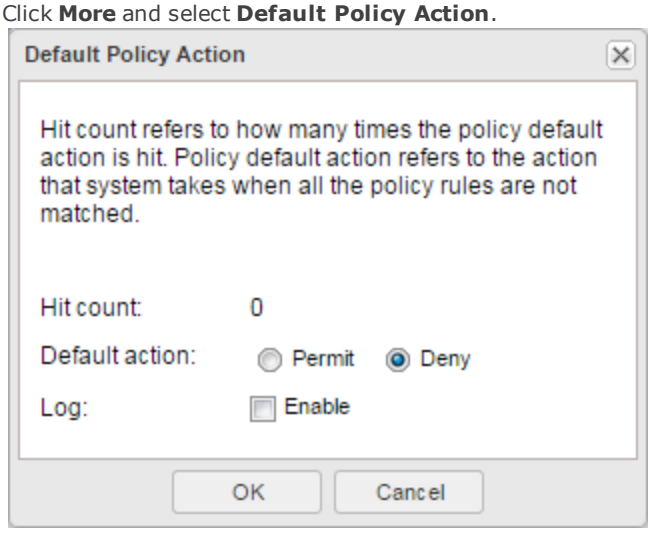
Configuring Default Action

You can specify a default action for the traffic that is not matched with any configured policy rule. System will process the traffic according to the specified default action. By default system will deny such traffic.

To specify a default policy action, take the following steps:

1. Select **Policy > Security Policy**.

2. Click **More** and select **Default Policy Action**.



In the Default Policy Action dialog box, configure the following options.

Option	Description
Hit count	Shows the statistics on policy matching.
Default action	Specify a default action for the traffic that is not matched with any configured policy rule. • Click **Permit** to permit the traffic to pass through. • Click **Deny** to deny the traffic.
Log	Configure to generate logs for the traffic that is not matched with any configured policy rule. By default system will not generate logs for such traffic. To enable log, select the **Enable** check box, and system will generate logs for such traffic.

3. Click **OK** to save your changes.

Viewing and Clearing Policy Hit Count

System supports statistics on policy hit counts, i.e., statistics on the matching between traffic and policy rules. Each time the inbound traffic is matched with a certain policy rule, the hit count will increase by 1 automatically.

To view a policy hit count, click **Policy > Security Policy**. In the policy rule list, view the statistics on policy hit count under the Hit Count column.

To clear a policy hit count, take the following steps:

1. Select **Policy > Security Policy**.
2. Click **More** and select **Clearing Policy Hit Count**.

In the Clearing Hit Count dialog box, configure the following options.

Option	Description
All policies	Clears the hit counts for all policy rules.
Default policy	Clears the hit counts for the default action policy rules.
Policy ID	Clears the hit counts for a specified ID policy rule.
Name	Clears the hit counts for a specified name policy rule.

3. Click **OK** to perform the hit count clearing.

Hit Count Check

System supports to check policy rule hit counts.

To check hit count, take the following steps:

1. Select **Policy > Security Policy**.
2. Click **More** and select **Hit Count Check**. After the check, the policy rules whose hit count is 0 will be highlighted. That means that the policy rule is not used in system.

Rule Redundancy Check

In order to make the rules in the policy effective, system provides a method to check the conflicts among rules in a policy. With this method, administrators can check whether the rules overshadow each other.

To start a rule redundancy check, take the following steps:

1. Select **Policy > Security Policy**.
2. Click **More** and select **Redundancy Check**. After the check, system will highlight the policy rule which is over-shadowed.

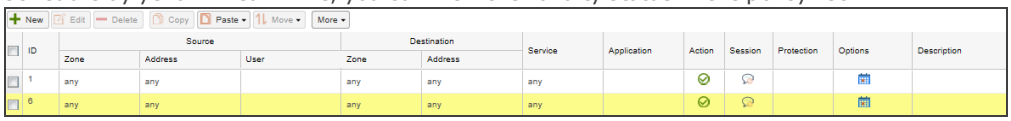
> **Note:** Status will be shown below the policy list when redundancy check is started. It is not recommended to edit a policy rule during the redundancy check. You can click ✕ to stop the check manually.

Schedule Validity Check

In order to make sure that the policies based on schedule are effective, system provides a method to check the validity of policies. After checking the policy, the invalid policies based on schedule will be highlighted by yellow.

To check schedule validity:

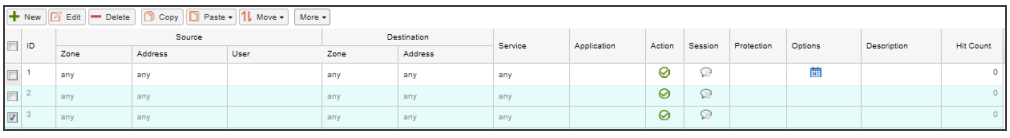
1. Select **Policy > Security Policy** to enter the **Security Policy** page.
2. Click **More** and select **Schedule Validity Check**. After check, system will highlight the invalid policy based on schedule by yellow. Meanwhile, you can view the validity status in the policy list.



Showing Disabled Policies

To show disabled policies:

1. Select **Policy > Security Policy** to enter the **Security Policy** page.
2. Click **More** and select **Show Disabled Policies**. The disabled policies will be highlighted by green in the policy list.



Note:

- By default(the "Schedule Validity Check" and "Show Disabled Policies" are not selected), the policy list only displays the enabled policies which are not highlighted.
- When you select both "Schedule Validity Check" and "Show Disabled Policies", the policy is managed as follows:
  - The policy list will display the "Validity" column, which shows the validity status of policies.
  - The invalid policy based on schedule will be highlighted by yellow no matter if the policy is disabled or not.
  - If the valid policy based on schedule is disabled, it will be highlighted by green.

User Online Notification

The system provides the policy-based user online notification function. The user online notification function integrates WebAuth function and Web redirect function.

After configuring the user online notification function, system redirects your HTTP request to a new notification page when you visit the Internet for the first time. In the process, a prompt page (see the picture below) will be shown first, and after you click **continue** on this page, system will redirect your request to the specified notification page. If you want to visit your original URL, you need to type the URL address into the Web browser.

Before you enable the user online notification function, you must configure the WebAuth function. For more information about configuring WebAuth function, view "Web Authentication" on Page 89.

Configuring User Online Notification

To configure the user online notification function, take the following steps:

1. Select **Policy > Security Policy**.
2. Select the security policy rule with which you want to enable the user online notification function. Generally, it is recommended to select the security policy rule which is under the WebAuth policy rule and whose action is permit to transmit the HTTP traffic.
3. Click **Edit**.
4. In the Basic tab, select the **Enable Web Redirect** check box and type the notification URL into the **Notification page URL** box.
5. Click **OK** to save the settings.

Configuring the Parameters of User Online Notification

The parameters are:

- Idle time: The time that an online user stays online without traffic transmitting. If the idle time is exceeded, the HTTP request will be redirected to the user online notification page again.
- Background picture: You can change the background picture on the prompt page.

To configure the parameters, take the following steps:

1. Select **Policy > Security Policy**.
2. Select the security policy rule with the user online notification function enabled.
3. Click **More** and select **Web Redirect Configuration**.
4. Type the idle time value into the **Idle time** box. The default value is 30 minutes. The range is 3 to 1440 minutes.

5. Change the background picture of the prompt page. Click **Browse** to choose the picture you want, and then click **Upload**. The uploaded picture must be zipped and named as web_redirect_bg_en.gif, with the size of 800px*600px.

Viewing Online Users

After configuring the user online notification function, you can get the information of online users from the Online Notification Users dialog box.

1. Select **Policy > Security Policy**.
2. Click **More** and select **Web Redirect IP List**.
3. **In the Web Redirect IP List dialog box, view the following information.**

Option	Description
IP address	The IP address of the online user.
Session number	Session number of the online user.
Interface	The source interface of the online user.
Lifetime (s)	The period of time during which the user is staying online.
Expiration (s)	The idle time of the user.

iQoS

System provides iQoS (intelligent quality of service) which guarantees the customer's network performance, manages and optimizes the key bandwidth for critical business traffic, and helps the customer greatly in fully utilizing their bandwidth resources.

iQoS is used to provide different priorities to different traffic, in order to control the delay and flapping, and decrease the packet loss rate. iQoS can assure the normal transmission of critical business traffic when the network is over-loaded or congested. iQoS is controlled by license. To use iQoS, apply and install the iQoS license.

Note: If you have configured QoS in the previous QoS function before upgrading the system to verion 5.5, the previous QoS function will take effect. You still need to configure the previous QoS function in CLI. You cannot use the newest iQoS function in version 5.5 and the newest iQoS function will not display in the WebUI and will not take effect. If you have not configured the previous QoS function before upgrading the system to version 5.5, the system will enable the newest iQoS function in version 5.5. You can configure iQoS function in the WebUI and the previous QoS function will not take effect.

Implement Mechanism

The packets are classified and marked after entering system from the ingress interface. For the classified and marked traffic, system will smoothly forward the traffic through the shaping mechanism, or drop the traffic through the policing mechanism. If the shaping mechanism is selected to forward the traffic, the congestion management and congestion avoidance mechanisms will give different priorities to different types of packets so that the packets of higher priority can pass though the gateway earlier to avoid network congestion.

In general, implementing QoS includes:

- Classification and marking mechanism: Classification and marking is the process of identifying the priority of each packet. This is the first step of iQoS.
- Policing and shaping mechanisms: Policing and shaping mechanisms are used to identify traffic violation and make responses. The policing mechanism checks the traffic in real time and takes immediate actions according to the settings when it discovers a violation. The shaping mechanism works together with queuing mechanism. It makes sure that the traffic will never exceed the defined flow rate so that the traffic can go through that interface smoothly.
- Congestion management mechanism: Congestion management mechanism uses the queuing theory to solve problems in the congested interfaces. As the data rate can be different among different networks, congestion may happen to both wide area network (WAN) and local area network (LAN). Only when an interface is congested will the queuing theory begin to work.
- Congestion avoidance mechanism: Congestion avoidance mechanism is a supplement to the queuing algorithm, and it also relies on the queuing algorithm. The congestion avoidance mechanism is designed to process TCP-based traffic.

Pipes and Traffic Control Levels

System supports two-level traffic control: level-1 control and level-2 control. In each level, the traffic control is implemented by pipes.

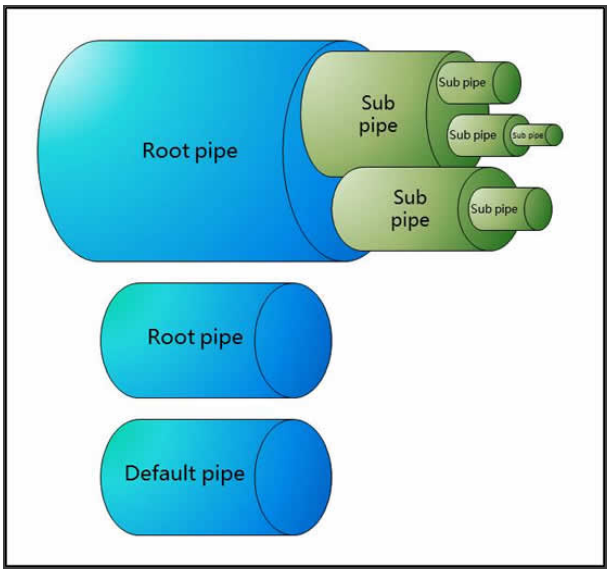
Pipes

By configuring pipes, the devices implement iQoS. Pipe, which is a virtual concept, represents the bandwidth of transmission path. System classifies the traffic by using the pipe as the unit, and controls the traffic crossing the pipes according to the actions defined for the pipes. For all traffic crossing the device, they will flow into virtual pipes according to the traffic matching conditions they match. If the traffic does not match any condition, they will flow into the default pipe predefined by the system.

Pipes, except the default pipe, include two parts of configurations: traffic matching conditions and traffic management actions:

- Traffic matching conditions: Defines the traffic matching conditions to classify the traffic crossing the device into matched pipes. System will limit the bandwidth to the traffic that matches the traffic matching conditions. You can define multiple traffic matching conditions to a pipe. The logical relation between each condition is OR. When the traffic matches a traffic matching condition of a pipe, it will enter this pipe. If the same conditions are configured in different root pipes, the traffic will first match the root pipe listed at the top of the Level-1 Control list in the Policy > iQoS page.
- Traffic management actions: Defines the actions adopted to the traffic that has been classified to a pipe. The data stream control includes the forward control and the backward control. Forward control controls the traffic that flows from the source to the destination; backward control controls the traffic flows from the destination to the source.

To provide flexible configurations, system supports the multiple-level pipes. Configuring multiple-level pipes can limit the bandwidth of different applications of different users. This can ensure the bandwidth for the key services and users. Pipes can be nested to at most four levels. Sub pipes cannot be nested to the default pipe. The logical relation between pipes is shown as below:

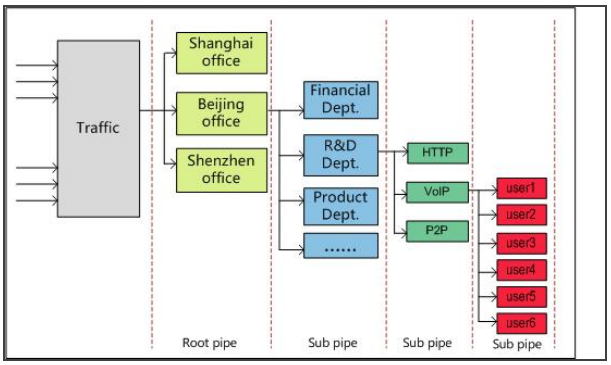


- You can create multiple root pipes that are independent. At most three levels of sub pipes can be nested to the root pipe.
- For the sub pipes at the same level, the total of their minimum bandwidth cannot exceed the minimum bandwidth of their upper-level parent pipe, and the total of their maximum bandwidth cannot exceed the maximum bandwidth of their upper-level parent pipe.
- If you have configured the forward or backward traffic management actions for the root pipe, all sub pipes that belong to this root pipe will inherit the configurations of the traffic direction set on the root pipe.
- The root pipe that is only configured the backward traffic management actions cannot work.

The following chart illustrates the application of multiple-level pipes in a company. The administrator can create the following pipes to limit the traffic:

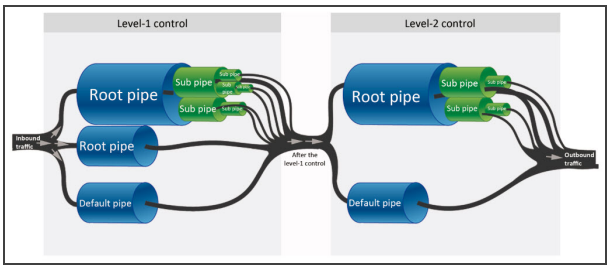
1. Create a root pipe to limit the traffic of the office located in Beijing.
2. Create a sub pipe to limit the traffic of its R&D department.
3. Create a sub pipe to limit the traffic of the specified applications so that each application has its own bandwidth.

4. Create a sub pipe to limit the traffic of the specified users so that each user owns the defined bandwidth when using the specified application.



Traffic Control Levels

System supports two-level traffic control: level-1 control and level-2 control. In each level, the traffic control is implemented by pipes. Traffic that is dealt with by level-1 control flows into the level-2 control, and then system performs the further management and control according to the pipe configurations of level-2 control. After the traffic flowing into the device, the process of iQoS is shown as below:



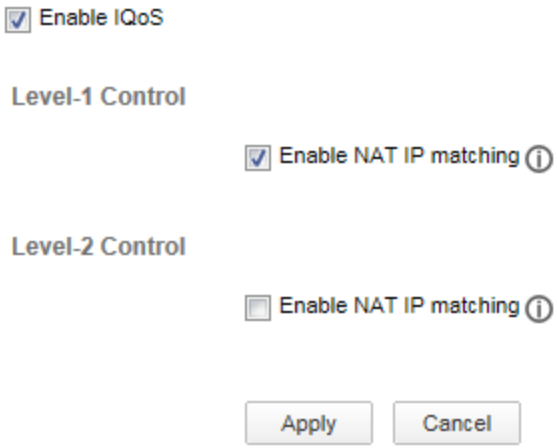
According to the chart above, the process of traffic control is described below:

1. The traffic first flows into the level-1 control, and then system classifies the traffic into different pipes according to the traffic matching conditions of the pipe of level-1 control. The traffic that cannot match any pipe will be classified into the default pipe. If the same conditions are configured in different root pipes, the traffic will first match the root pipe listed at the top of the Level-1 Control list in the **Policy > iQoS** page. After the traffic flows into the root pipe, system classifies the traffic into different sub pipes according to the traffic matching conditions of each sub pipe.
2. According to the traffic management actions configured for the pipes, system manages and controls the traffic that matches the traffic matching conditions.
3. The traffic dealt with by level-1 control flows into the level-2 control. System manages and controls the traffic in level-2 control. The principles of traffic matching, management and control are the same as the one of the level-1 control.
4. Complete the process of iQoS.

Enabling iQoS

To enable iQoS, take the following steps:

1. Select **Policy > iQoS > Configuration**.
2. Select the **Enable iQoS** check box.



3. If you select the **Enable NAT IP matching** check box in **Level-1 Control** or **Level-2 Control**, system will use the IP addresses between the source NAT and the destination NAT as the matching items. If the matching is successful, system will limit the speed of these IP addresses.

> **Note:** Before enabling NAT IP matching, you must config the NAT rules. Otherwise, the configuration will not take effect.

4. Click **Apply** to save the configurations.

Pipes

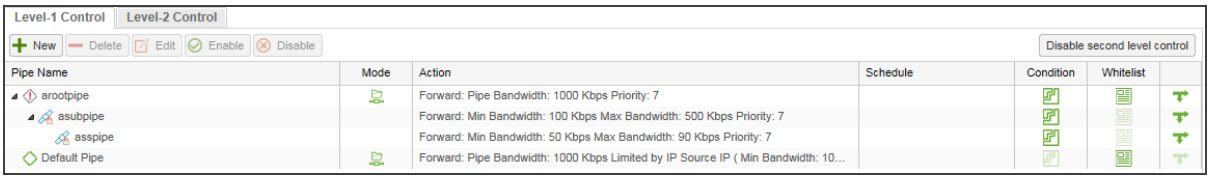
By using pipes, devices implement iQoS. Pipes in different traffic control levels will take effect in different stages.

Configuring pipes includes the following sections:

1. Create the traffic matching conditions, which are used to capture the traffic that matches these conditions. If configuring multiple traffic matching conditions for a pipe, the logical relation between each condition is OR.
2. Create a white list according to your requirements. System will not control the traffic in the white list. Only root pipe and the default pipe support the white list.
3. Specify the traffic management actions, which are used to deal with the traffic that is classified into a pipe.
4. Specify the schedule. The pipe will take effect during the specified time period.

Basic Operations

Select **Policy > iQoS > Policy** to open the Policy page.



You can perform the following actions in this page:

- Disable the level-2 traffic control: Click **Disable second level control**. The pipes in the level-2 traffic control will not take effect. The Level-2 Control tab will not appears in this page.
- View pipe information: The pipe list displays the name, mode, action, schedule, and the description of the pipes.
  - Click the icon to expand the root pipe and display its sub pipes.
  - Click the icon of the root pipe or the sub pipe to view the condition settings.
  - Click the icon of the root pipe to view the white list settings.
  - represents the root pipe is usable, represents the root pipe is unusable, represents the sub pipe is usable, represents the sub pipe is unusable, flow-two the gray text represents the pipe is disabled.
- Create a root pipe: Select the Level-1 Control or Level-2 Control tab, then click **New** in the menu bar to create a new root pipe.
- Create a sub pipe: Click the icon of the root pipe or the sub pipe to create the corresponding sub pipe.
- Click **Enable** in the menu bar to enable the selected pipe. By default, the newly-created pipe will be enabled.
- Click **Disable** in the menu bar to disable the selected pipe. The disabled pipe will not take effect.
- Click **Delete** to delete the selected pipe. The default pipe cannot be deleted.

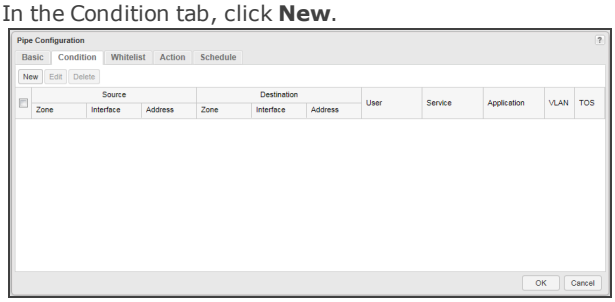
Configuring a Pipe

To configure a pipe, take the following steps:

1. According to the methods above, create a root pipe or sub pipe. The Pipe Configuration page appears.
2. **In the Basic tab, specify the basic pipe information.**

- Parent Pipe/Control Level: Displays the control level or the parent pipe of the newly created pipe.
- Pipe Name: Specify a name for the new pipe.
- Description: Specify the description of this pipe.
- QoS Mode: Shape, Policy, or Monitor.
  - The Shape mode can limit the data transmission rate and smoothly forward the traffic. This mode supports the bandwidth borrowing and priority adjusting for the traffic within the root pipe.
  - The Policy mode will drop the traffic that exceeds the bandwidth limit. This mode does not support the bandwidth borrowing and priority adjusting, and cannot guarantee the minimum bandwidth.
  - The Monitor mode will monitor the matched traffic, generate the statistics, and will not control the traffic.
  - Bandwidth borrowing: All of the sub pipes in a root pipe can lend their idle bandwidth to the pipes that are lacking bandwidth. The prerequisite is that their bandwidth must be enough to forward the traffic in their pipes.
  - Priority adjusting: When there is traffic congestion, system will arrange the traffic to enter the waiting queue. You can set the traffic to have higher priority and system will deal with the traffic in order of precedence.

3. In the Condition tab, click **New**.



In the Condition Configuration tab, configure the corresponding options.

Option	Description
Type	Select the IP type, including IPv4 or IPv6. Only the IPv6 firmware supports to configure IPv6 type IP. If IPv6 is selected, all the IP/netmask, IP range, address entry configured should be in the IPv6 format.
Source Information	
Zone	Specify the source zone of the traffic. Select the zone name from the drop-down menu.
Interface	Specify the source interface of the traffic. Select the interface name from the drop-down menu.
Address	Specify the source address of the traffic. 1. Select an address type from the **Address** drop-down list. 2. Select or type the source addresses based on the selected type. 3. Click → to add the addresses to the right pane. 4. After adding the desired addresses, click the blank area in this dialog box to complete the address configuration. You can also perform other operations: • When selecting the **Address Book** type, you can click **Add** to cre-

Option	Description
	ate a new address entry. • The default address configuration is any. To restore the configuration to this default one, select the **any** check box.
Destination Information	
Zone	Specify the destination zone of the traffic. Select the zone name from the drop-down menu.
Interface	Specify the destination interface of the traffic. Select the interface name from the drop-down menu.
Address	Specify the destination address of the traffic. 1. Select an address type from the **Address** drop-down list. 2. Select or type the source addresses based on the selected type. 3. Click → to add the addresses to the right pane. 4. After adding the desired addresses, click the blank area in this dialog box to complete the address configuration. You can also perform other operations: • When selecting the **Address Book** type, you can click **Add** to create a new address entry. • The default address configuration is any. To restore the configuration to this default one, select the **any** check box.
User Information	Specify a user or user group that the traffic belongs to. 1. From the **User** drop-down menu, select the AAA server where the users and user groups reside. 2. Based on different types of AAA server, you can execute one or more actions: search a user/user group/role, expand the user-/user group list, and enter the name of the user/user group. 3. After selecting users/user groups/roles, click → to add them to the right pane. 4. After adding the desired objects, click the blank area in this dialog box to complete the user information configuration.
Service	Specify a service or service group that the traffic belongs to. 1. From the **Service** drop-down menu, select a type: Service, Service Group. 2. You can search the desired service/service group, expand the service/service group list. 3. After selecting the desired services/service groups, click → to add them to the right pane. 4. After adding the desired objects, click the blank area in this dialog box to complete the service configuration. You can also perform other operations: • To add a new service or service group, click **Add**.

Option	Description
	• The default service configuration is any. To restore the configuration to this default one, select the **any** check box.
Application	Specify an application, application group, or application filters that the traffic belongs to. 1. From the **Application** drop-down menu, you can search the desired application/application group/application filter, expand the list of applications/application groups/application filters. 2. After selecting the desired applications/application groups/application filters, click to add them to the right pane. 3. After adding the desired objects, click the blank area in this dialog to complete the application configuration. You can also perform other operations: • To add a new application group, click **New AppGroup**. • To add a new application filter, click **New AppFilter**.
URL Category	Specifies the URL category that the traffic belongs to. After the user specifies the URL category, the system matches the traffic according to the specified category. 1. In the "URL category" drop-down menu, the user can select one or more URL categories, up to 8 categories. 2. After selecting the desired filters, click the blank area in this dialog to complete the configuration. To add a new URL category, click the **"New"** button, the page will pop up "URL category" dialog box. In this dialog box, the user can configure the category name and URL. Select a URL category, click the **"Edit"** button, the page will pop up "URL category" dialog box. In this dialog box, the user can edit the URL in the category.
Advanced	
TOS	Specify the TOS fields of the traffic; or click **Configure** to specify the TOS fields of the IP header of the traffic in the TOS Configuration dialog box. • Precedence: Specify the precedence. • Delay: Specify the minimum delay. • Throughput: Specify the maximum throughput. • Reliability: Specify the highest reliability. • Cost: Specify the minimum cost. • Reserved: Specify the normal service.
TrafficClass	Specify the TOS fields of the traffic.

4. If you are configuring root pipes, you can specify the white list settings based on the description of configuring conditions.

5. **In the Action tab, configuring the corresponding actions.**

Forward (From source to destination)	
The following configurations control the traffic that flows from the source to the destination. For the traffic that matches the conditions, system will perform the corresponding actions.	
Pipe Bandwidth	When configuring the root pipe, specify the pipe bandwidth. When configuring the sub pipe, specify the maximum bandwidth and the minimum bandwidth of the pipe: • Min Bandwidth: Specify the minimum bandwidth. If you want this minimum bandwidth to be reserved and cannot be used by other pipes, select **Enable Reserved Bandwidth**. • Max Bandwidth: Specify the maximum bandwidth.

Limit type	Specify the maximum bandwidth and minimum bandwidth of the pipe for each user/IP:
	• Type: Select the type of the bandwidth limitation: **No Limit**, **Limit Per IP**, or **Limit Per User**.
	  • **No Limit** represents that system will not limit the bandwidth for each IP or each user.
	  • **Limit Per IP** represents that system will limit the bandwidth for each IP. In the Limit by section, select **Source IP** to limit the bandwidth of the source IP in this pipe; or select **Destination IP** to limit the bandwidth of the destination IP in this pipe.
	  • **Limit Per User** represents that system will limit the bandwidth for each user. In the Limit by section, specify the minimum/maximum bandwidth of the users.
	• When configuring the root pipe, you can select the **Enable Average Bandwidth** check box to make each source IP, destination IP, or user to share an average bandwidth.

Limit by	When the Limit type is **Limit Per IP** or **Limit Per User**, you need to specify the minimum bandwidth or the maximum bandwidth: • Min Bandwidth: Specify the minimum bandwidth. • Max Bandwidth: Specify the maximum bandwidth.
Advanced	
Priority	Specify the priority for the pipes. Select a number, between 0 and 7, from the drop-down menu. The smaller the value is, the higher the priority is. When a pipe has higher priority, system will first deal with the traffic in it and borrow the extra bandwidth from other pipes for it. The priority of the default pipe is 7.
TOS	Specify the TOS fields of the traffic; or click **Configure** to specify the TOS fields of the IP header of the traffic in the appeared TOS Configuration page. • Precedence: Specify the precedence. • Delay: Specify the minimum delay. • Throughput: Specify the maximum throughput.

	• Reliability: Specify the highest reliability. • Cost: Specify the minimum monetary cost. • Reserved: Specify the normal service.
Limit Opposite Bandwidth	Select the **Limit Opposite Bandwidth** check box to configure the value of limit-strength.The smaller the value, the smaller the limit.
Backward (From condition's destination to source)	
The following configurations control the traffic that flows from the destination to the source. For the traffic that matches the conditions, system will perform the corresponding actions.	
Pipe Bandwidth	When configuring the root pipe, specify the pipe bandwidth. When configuring the sub pipe, specify the maximum bandwidth and the minimum bandwidth of the pipe: • Min Bandwidth: Specify the minimum bandwidth. If you want this minimum bandwidth to be reserved and cannot be used by other pipes, select **Enable Reserved Bandwidth**. • Max Bandwidth: Specify the maximum bandwidth.

Limit type	Specify the maximum bandwidth and minimum bandwidth of the pipe for each user/IP:
	• Type: Select the type of the bandwidth limitation: **No Limit**, **Limit Per IP**, or **Limit Per User**.
	  • **No Limit** represents that system will not limit the bandwidth for each IP or each user.
	  • **Limit Per IP** represents that system will limit the bandwidth for each IP. In the Limit by section, select **Source IP** to limit the bandwidth of the source IP in this pipe; or select **Destination IP** to limit the bandwidth of the destination IP in this pipe.
	  • **Limit Per User** represents that system will limit the bandwidth for each user. In the Limit by section, specify the minimum/maximum bandwidth of the users.
	• When configuring the root pipe, you can select the **Enable Average Bandwidth** check box to make each source IP, destination IP, or user to share an average bandwidth.

Limit by	When the Limit type is **Limit Per IP** or **Limit Per User**, you need to specify the minimum bandwidth or the maximum bandwidth: • Min Bandwidth: Specify the minimum bandwidth. • Max Bandwidth: Specify the maximum bandwidth.
Advanced	
Priority	Specify the priority for the pipes. Select a number, between 0 and 7, from the drop-down menu. The smaller the value is, the higher the priority is. When a pipe has higher priority, system will first deal with the traffic in it and borrow the extra bandwidth from other pipes for it. The priority of the default pipe is 7.
TOS	Specify the TOS fields of the traffic; or click **Configure** to specify the TOS fields of the IP header of the traffic in the appeared TOS Configuration

	page. • Precedence: Specify the precedence. • Delay: Specify the minimum delay. • Throughput: Specify the maximum throughput. • Reliability: Specify the highest reliability. • Cost: Specify the minimum monetary cost. • Reserved: Specify the normal service.
Limit Opposite Bandwidth	Select the **Limit Opposite Bandwidth** check box to configure the value of limit-strength.The smaller the value, the smaller the limit.

6. In the Schedule tab, configure the time period when the pipe takes effect. Select the schedule from the drop-down list, or create a new one.
7. Click **OK** to save the settings.

Viewing Statistics of Pipe Monitor

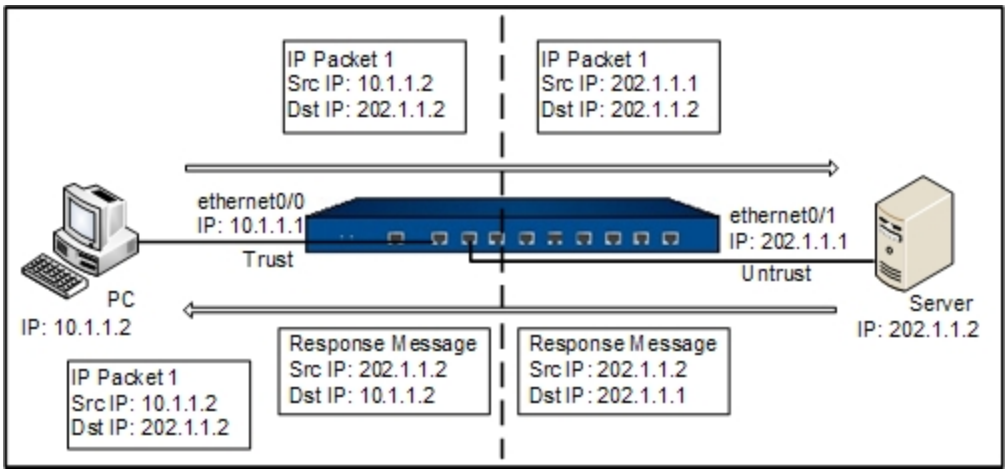
To view the statistics of pipe monitor, see "iQoS" on Page 293.

NAT

NAT, Network Address Translation, translates the IP address within an IP packet header to another IP address. When the IP packets pass through the devices or routers, the devices or routers will translate the source IP address and/or the destination IP address in the IP packets. In practice, NAT is mostly used to allow the private network to access the public network, vice versa.

Basic Translation Process of NAT

When a device is implementing the NAT function, it lies between the public network and the private network. The following diagram illustrates the basic translation process of NAT.



As shown above, the device lies between the private network and the public network. When the internal PC at 10.1.1.2 sends an IP packet (IP packet 1) to the external server at 202.1.1.2 through the device, the device checks the packet header. Finding that the IP packet is destined to the public network, the device translates the source IP address 10.1.1.2 of packet 1 to the public IP address 202.1.1.1 which can get routed on the Internet, and then forwards the packet to the external server. At the same time, the device also records the mapping between the two addresses in its NAT table. When the response packet of IP packet 1 reaches the device, the device checks the packet header again and finds the mapping records in its NAT table, and replaces the destination address with the private address 10.1.1.2. In this process, the device is transparent to the PC and the Server. To the external server, it considers that the IP address of the internal PC is 202.1.1.1 and knows nothing about the private address 10.1.1.2. Therefore, NAT hides the private network of enterprises.

Implementing NAT

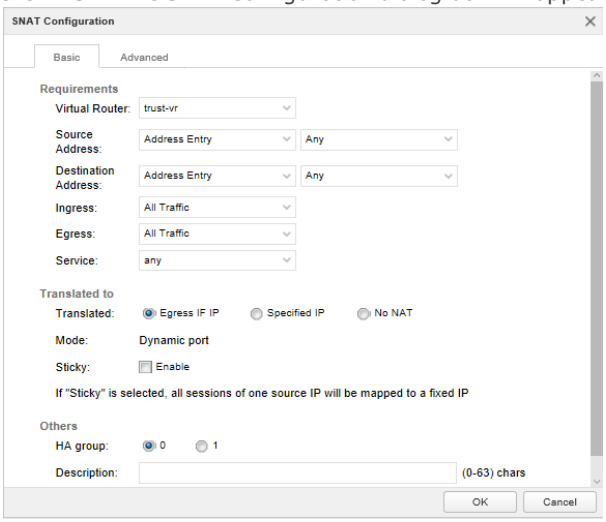
The devices translate the IP address and port number of the internal network host to the external network address and port number, and vice versa. This is the translation between the "private IP address + port number" and "public IP address + port number".

The devices achieve the NAT function through the creation and implementation of NAT rules. There are two types of NAT rules, which are source NAT rules (SNAT Rule) and destination NAT rules (DNAT Rule). SNAT translates source IP addresses, thereby hiding the internal IP addresses or sharing the limited IP addresses; DNAT translates destination IP addresses, and usually the IP addresses of internal servers (such as the WWW server or SMTP server) protected by the device is translated to public IP addresses.

Configuring SNAT

To create an SNAT rule, take the following steps:

1. Select **Policy > NAT > SNAT**.
2. Click **New**. The SNAT Configuration dialog box will appear.



In the Basic tab, configure the following options.

Requirements	
Virtual Router	Specifies a VRouter for the SNAT rule. The SNAT rule will take effect when the traffic flows into this VRouter and matches the SNAT rule conditions.
Source Address	Specifies the source IP address of the traffic, including: • Address Entry - Select an address entry from the drop-down list. • IP Address - Type an IP address into the box. • IP/Netmask - Type an IP address and its netmask into the box.
Destination Address	Specifies the destination IP address of the traffic, including: • Address Entry - Select an address entry from the drop-down list. • IP Address - Type an IP address into the box. • IP/Netmask - Type an IP address and its netmask into the box.
Ingress	Specifies the ingress traffic, the default value is all traffic. • All traffic - Specifies all traffic as the ingress traffic. Traffic from any ingress interfaces will continue to match this SNAT rule. • Ingress Interface - Specifies the ingress interface of traffic. Select an interface from the drop-down list. When the interface is specified, only the traffic from this interface will continue to match this SNAT rule, while traffic from other interfaces will not.
Egress	Specifies the egress traffic, the default value is all traffic. • All traffic - Specifies all traffic as the egress traffic. Traffic from all egress interfaces will continue to match this SNAT rule. • Egress Interface - Specifies the egress interface of traffic. Select

Requirements	
	an interface from the drop-down list. When the interface is specified, only the traffic from this interface will continue to match this SNAT rule, while traffic from other interfaces will not. • Next Virtual Router - Specifies the next virtual router of traffic. Select a virtual router from the drop-down list.
Service	Specifies the service type of the traffic from the drop-down list. To create a new service or service group, click **New Service** or **New Group**.
Translate to	
Translated	Specifies the translated NAT IP address, including: • Egress IF IP - Specifies the NAT IP address to be an egress interface IP address. • Specified IP - Specifies the NAT IP address to be a specified IP address. After selecting this option, continue to specify the available IP address in the **Address** drop-down list. • No NAT - Do not implement NAT.

Mode	Specifies the translation mode, including:
	• Static - Static mode means one-to-one translation. This mode requires the translated address entry to contain the same number of IP addresses as that of the source address entry.
	• Dynamic IP - Dynamic IP mode means multiple-to-one translation. This mode translates the source address to a specific IP address. Each source address will be mapped to a unique IP address, until all specified addresses are occupied.
	• Dynamic port - Called PAT. Multiple source addresses will be translated to one specified IP address in an address entry.
	  • If Sticky is enabled, all sessions from an IP address will be mapped to the same fixed IP address. Click the **Enable** check box behind Sticky to enable Sticky. You can also track if the public address after NAT is available, i.e., use the translated address as the source address to track if the destination website or host is accessible. Select the **Enable** check box behind Track to enable the function, and select a track object from the drop-down list.
	  • If Round-robin is enabled, all sessions from an IP address will be mapped to the same fixed IP address. Click the **Enable** check box behind Round-robin to enable Round-robin.
	  • If Sticky and Round-robin are not enabled, the first address in the address entry will be used first; when the port resources of the first address are exhausted, the second address will be used.
	Note : The Sticky function and the Round-robin function are mutually exclusive and cannot be configured at the same time.

Others	
HA Group	Specifies the HA group that the SNAT rule belongs to. The default setting is 0.

Requirements	
Description	Types the description.

In the Advanced tab, configure the corresponding options.

Option	Description
NAT Log	Select the Enable check box to enable the log function for this SNAT rule. The system will generate log information when there is traffic matching this NAT rule.
Position	Specifies the position of the rule. Each SNAT rule has a unique ID. When the traffic is flowing into the device, the device will search the SNAT rules in order, and then implement NAT on the source IP of the traffic according to the first matched rule. The sequence of the ID shown in the SNAT rule list is the order of the rule matching. Select one of the following items from the drop-down list: • Bottom - The rule is located at the bottom of all the rules in the SNAT rule list. By default, system will put the newly-created SNAT rule at the bottom of all SNAT rules. • Top - The rule is located at the top of all the rules in the SNAT rule list. • Before ID - Type the ID number into the text box. The rule will be located before the ID you specified. • After ID - Type the ID number into the text box. The rule will be located after the ID you specified.
ID	Specifies the method you get the rule ID. Each rule has its unique ID. It can be automatically assigned by system or manually assigned by yourself. If you select **Manually assign** , type an ID number into the box behind.

3. Click **OK** to save the settings.

Enabling/Disabling a SNAT Rule

By default the configured SNAT rule will take effect immediately. You can terminate its control over the traffic by disabling the rule.

To enable/disable a policy rule:

1. Select **Policy > NAT > SNAT**.
2. Select the SNAT rule that you want to enable/disable.
3. Click **Enable** or **Disable** to enable or disable the rule.

Adjusting Priority

Each SNAT rule has a unique ID. When the traffic flows into the device, the device will search the SNAT rules in order and then implement NAT on the source IP of the traffic according to the first matched rule. The sequence of the ID shown in the SNAT rule list is the order of the rule matching.

To adjust priority, take the following steps:

1. Select **Policy > NAT > SNAT**.
2. Select the rule you want to adjust its priority and click **Priority**.
3. In the Priority dialog box, move the selected rule to:

- Top: The rule is moved to the top of all of the rules in the SNAT rule list.
- Bottom: The rule is moved to the bottom of all of the rules in the SNAT rule list. By default, system will put the newly-created SNAT rule at the bottom of all of the SNAT rules.
- Before ID: Specifies an ID number. The rule will be moved before the ID you specified.
- After ID: Specifies an ID number. The rule will be moved after the ID you specified.

4. Click **OK** to save the settings.

Copying/Pasting a SNAT Rule

To copy/paste a SNAT rule, take the following steps:

1. Select **Policy > NAT > SNAT**.
2. Select the SNAT rule that you want to clone and click **Copy**.
3. Click **Paste**. In the pop-up, select the desired position. Then the rule will be cloned to the desired position.
   - Top: The rule is pasted to the top of all the rules in the SNAT rule list.
   - Bottom: The rule is pasted to the bottom of all the rules in the SNAT rule list.
   - Before the Rule Selected: The rule will be pasted before the Rule being selected.
   - After the Rule Selected: The rule will be pasted after the Rule being selected.

Exporting NAT444 Static Mapping Entries

You can export the NAT444 static mapping entries to a file . The exported file contains the ID, source IP address, translated IP address, start port, end port, and the protocol information.

To export the NAT444 static mapping entries, take the following steps:

1. Select **Policy > NAT > SNAT**.
2. Click **Export NAT444 Static Mapping Entries.**
3. Select a location to store the file and click **Save**.

The exported file is CSV format. It is recommended to export the file through the management interface.

Hit Count

The system supports statistics on SNAT rule hit counts, i.e., statistics on the matching between traffic and SNAT rules. Each time the inbound traffic is matched to a certain SNAT rule, the hit count will increment by 1 automatically.

To view a SNAT rule hit count, click **Policy > NAT > SNAT**. In the SNAT rule list, view the statistics on SNAT rule hit count under the Hit Count column.

Clearing NAT Hit Count

To clear a SNAT rule hit count, take the following steps:

1. Select **Policy > NAT > SNAT**.
2. Click **Hit Count**, and select **Clearing NAT Hit Count** in the pop-up list.
3. In the **Clearing NAT Hit Count** dialog box, configure the following options:
   - All NAT: Clears the hit counts for all NAT rules.
   - NAT ID: Clears the hit counts for a specified NAT rule ID.
4. Click **OK**.

Hit Count Check

System supports to check policy rule hit counts.

To check hit count, take the following steps:

1. Select **Policy > NAT > SNAT**.
2. Click **Hit Count**, and select **Hit Count Check** in the pop-up list. After the check, the NAT rules whose hit count is 0 will be highlight, that is to say, the NAT rule is not used in system.

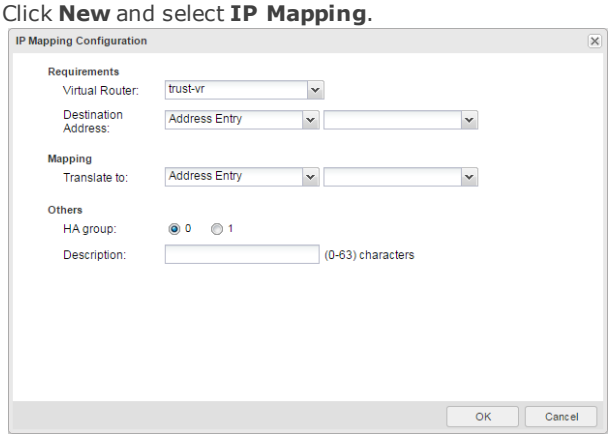
Configuring DNAT

DNAT translates destination IP addresses, usually the IP addresses of internal servers (such as the WWW server or SMTP server) protected by the device is translated to the public IP addresses.

Configuring an IP Mapping Rule

To configure an IP mapping rule, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Click **New** and select **IP Mapping**.



In the IP Mapping Configuration dialog box, configure the corresponding options.

Requirements	
Virtual Router	Specifies a VRouter for the DNAT rule. The DNAT rule will take effect when the traffic flows into this VRouter and matches the DNAT rule conditions.
Destination Address	Specifies the destination IP address of the traffic, including: • Address Entry - Select an address entry from the drop-down list. • IP Address - Type an IP address into the box. • IP/Netmask - Type an IP address and its netmask into the box.
Mapping	
Translate to	Specifies the translated NAT IP address, including **Address Entry**, **IP Address**, and **IP/Netmask**. The number of the translated NAT IP addresses you specified must be the same as the number of the destination IP addresses of the traffic.
Others	
HA Group	Specifies the HA group that the DNAT rule belongs to. The default setting is 0.
Description	Types the description.

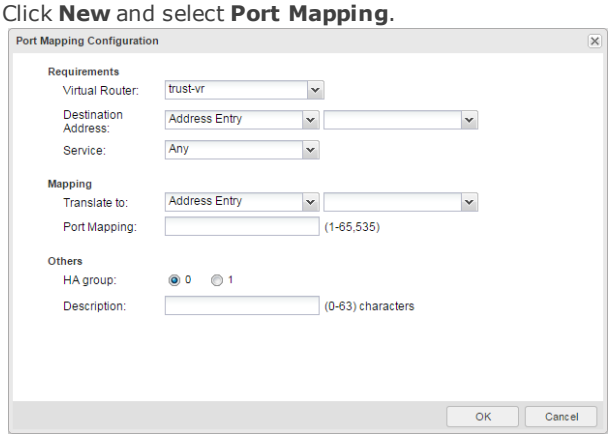
3. Click **OK** to save the settings.

Configuring a Port Mapping Rule

To configure a port mapping rule, take the following steps:

1. Select **Policy > NAT > DNAT**.

2. Click **New** and select **Port Mapping**.



In the Port Mapping Configuration dialog, configure the corresponding options.

Requirements	
Virtual Router	Specifies a VRouter for the DNAT rule. The DNAT rule will take effect when the traffic flows into this VRouter and matches the DNAT rule conditions.
Destination Address	Specifies the destination IP address of the traffic, including: • Address Entry - Select an address entry from the drop-down list. • IP Address - Type an IP address into the box. • IP/Netmask - Type an IP address and its netmask into the box.
Service	Specifies the service type of the traffic from the drop-down list. To create a new service or service group, click **New Service** or **New Group**.
Mapping	
Translate to	Specifies the translated NAT IP address, including **Address Entry**, **IP Address**, and **IP/Netmask**. The number of the translated NAT IP addresses you specified must be the same as the number of the destination IP addresses of the traffic.
Port Mapping	Types the translated port number of the Intranet server. The available range is 1 to 65535.
Others	
HA Group	Specifies the HA group that the DNAT rule belongs to. The default setting is 0.
Description	Types the description.

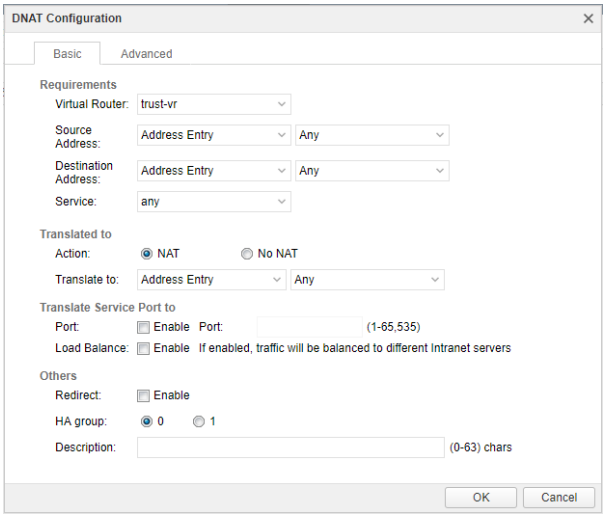
3. Click **OK** to save the settings.

Configuring an Advanced NAT Rule

You can create a DNAT rule and configure the advanced settings, or you can edit the advanced settings of an exiting DNAT rule.

To create a DNAT rule and configure the advanced settings, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Click **New** and select **Advanced Configuration**. To edit the advanced settings of an existing DNAT rule, select it and click **Edit**. The **DNAT configuration** dialog box will appear.



In the Basic tab, configure the following options.

Requirements	
Virtual Router	Specifies a VRouter for the DNAT rule. The DNAT rule will take effect when the traffic flows into this VRouter and matches the DNAT rule conditions.
Source Address	Specifies the source IP address of the traffic, including: • Address Entry - Select an address entry from the drop-down list. • IP Address - Type an IP address into the box. • IP/Netmask - Type an IP address and its netmask into the box.
Destination Address	Specifies the destination IP address of the traffic, including: • Address Entry - Select an address entry from the drop-down list. • IP Address - Type an IP address into the box. • IP/Netmask - Type an IP address and its netmask into the box.
Service	Specifies the service type of the traffic from the drop-down list. To create a new service or service group, click **New Service** or **New Group**.
Translated to	
Action	Specifies the action for the traffic you specified, including: • NAT - Implements NAT for the eligible traffic. • No NAT - Do not implement NAT for the eligible traffic.
Translate to	When selecting the **NAT** option, you need to specify the translated IP address. The options include **Address Entry**, **IP Address**, **IP/Netmask**, and **SLB Server Pool**. For more information about the SLB Server Pool, view "SLB Server Pool " on Page 213.
Translate Service Port to	
Port	Select **Enable** to translate the port number of the service that matches the conditions above.
Load Balance	Select **Enable** to enable the function. Traffic will be balanced to different Intranet servers.

Requirements	
Others	
Redirect	Select **Enable** to enable the function. When the number of this **Translate to** is different from the **Destination Address** of the traffic or the **Destination Address** address is **any**, you must enable the redirect function for this DNAT rule.
HA Group	Specifies the HA group that the DNAT rule belongs to. The default setting is 0.
Description	Types the description.

In the Advanced tab, configure the following options.

Track Server	
Track Ping Packets	After enabling this function, system will send Ping packets to check whether the Intranet servers are reachable.
Track TCP Packets	After enabling this function, System will send TCP packets to check whether the TCP ports of Intranet servers are reachable.
TCP Port	Specifies the TCP port number of the monitored Intranet server.
Others	
NAT Log	Enable the log function for this DNAT rule to generate the log information when traffic matches this NAT rule.
Position	Specifies the position of the rule. Each DNAT rule has a unique ID. When the traffic is flowing into the device, the device will search the DNAT rules by sequence, and then implement DNAT on the source IP of the traffic according to the first matched rule. The sequence of the ID shown in the DNAT rule list is the order of the rule matching. Select one of the following items from the drop-down list: • Bottom - The rule is located at the bottom of all of the rules in the DNAT rule list. By default, the system will put the newly-created DNAT rule at the bottom of all of the SNAT rules. • Top - The rule is located at the top of all of the rules in the DNAT rule list. • Before ID - Type the ID number into the text box. The rule will be located before the ID you specified. • After ID - Type the ID number into the text box. The rule will be located after the ID you specified.
ID	The ID number is used to distinguish between NAT rules. Specifies the method you get the rule ID. It can be automatically assigned by system or manually assigned by yourself.

3. Click **OK** to save the settings.

Enabling/Disabling a DNAT Rule

By default the configured DNAT rule will take effect immediately. You can terminate its control over the traffic by disabling the rule.

To enable/disable a policy rule, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Select the DNAT rule that you want to enable/disable.
3. Click **Enable** or **Disable** to enable or disable the rule.

Copying/Pasting a DNAT Rule

To copy/paste a DNAT rule, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Select the DNAT rule that you want to clone and click **Copy**.
3. Click **Paste**. In the pop-up, select the desired position. Then the rule will be cloned to the desired position.
   - Top: The rule is pasted to the top of all of the rules in the DNAT rule list.
   - Bottom: The rule is pasted to the bottom of all of the rules in the DNAT rule list.
   - Before the Rule Selected: The rule will be pasted before the Rule selected.
   - After the Rule Selected: The rule will be pasted after the Rule selected.

Adjusting Priority

Each DNAT rule has a unique ID. When the traffic is flowing into the device, the device will search the DNAT rules in order, and then implement NAT of the source IP of the traffic according to the first matched rule. The sequence of the ID shown in the DNAT rule list is the order of the rule matching.

To adjust priority, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Select the rule you want to adjust its priority and click **Priority**.
3. In the Priority dialog box, move the selected rule to:
   - Top: The rule is moved to the top of all of the rules in the DNAT rule list.
   - Bottom: The rule is moved to the bottom of all of the rules in the DNAT rule list. By default, system will put the newly-created DNAT rule at the bottom of all of the DNAT rules.
   - Before ID: Specifies an ID number. The rule will be moved before the ID you specified.
   - After ID: Specifies an ID number. The rule will be moved after the ID you specified.
4. Click **OK** to save the settings.

Hit Count

The system supports statistics on DNAT rule hit counts, i.e., statistics on the matching between traffic and DNAT rules. Each time the inbound traffic is matched to a certain DNAT rule, the hit count will increment by 1 automatically.

To view a DNAT rule hit count, click **Policy > NAT > DNAT**. In the DNAT rule list, view the statistics on DNAT rule hit count under the Hit Count column.

Clearing NAT Hit Count

To clear a DNAT rule hit count, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Click **Hit Count**, and select **Clearing NAT Hit Count** in the pop-up list.
3. In the **Clearing NAT Hit Count** dialog box, configure the following options:
   - All NAT: Clears the hit counts for all NAT rules.
   - NAT ID: Clears the hit counts for a specified NAT rule ID.
4. Click **OK**.

Hit Count Check

System supports to check policy rule hit counts.

To check hit count, take the following steps:

1. Select **Policy > NAT > DNAT**.
2. Click **Hit Count**, and select **Hit Count Check** in the pop-up list. After the check, the NAT rules whose hit count is 0 will be highlighted. This shows that the NAT rule is not being used in system.

SLB Server

View SLB server status: After you enabling the track function (PING track, TCP track, or UDP track), system will list the status and information of the intranet servers that are tracked.

View SLB server pool status: After you enabling the server load balancing function, system will monitor the intranet servers and list the corresponding status and information.

Viewing SLB Server Status

To view the SLB server status, take the following steps:

1. Select **Policy > NAT > SLB Server Status**.
2. You can set the filtering conditions according to the virtual router, SLB server pool, and server address and then view the information.

Option	Description
Server	Shows the IP address of the server.
Port	Shows the port number of the server.
Status	Shows the status of the server.
Current Sessions	Shows the number of current sessions.
DNAT	Shows the DNAT rules that uses the server.
HA Group	Shows the HA group that the server belongs to.

Viewing SLB Server Pool Status

To view the SLB server pool status, take the following steps:

1. Select **Policy > NAT > SLB Server Pool Status**.
2. You can set the filtering conditions according to the virtual router, algorithm, and server pool name and then view the information.

Option	Description
Name	Shows the name of the server pool name.
Algorithms	Shows the algorithm used by the server pool.
DNAT	Shows the DNAT rules that use the server.
Abnormal Server-/All Servers	Shows the number of abnormal servers and the total number of the servers.
Current Sessions	Shows the number of current sessions.

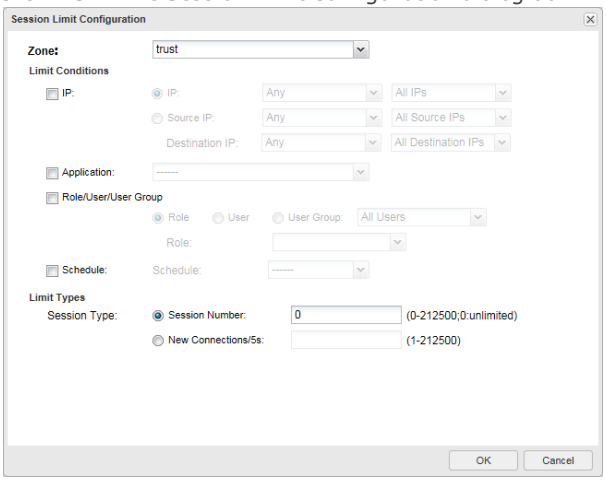
Session Limit

The devices support zone-based session limit function. You can limit the number of sessions and control the session rate to the source IP address, destination IP address, specified IP address, applications or role/user/user group, thereby protecting from DoS attacks and controlling the bandwidth of applications, such as IM or P2P.

Configuring a Session Limit Rule

To configure a session limit rule, take the following steps:

1. Select **Policy > Session Limit**.
2. Click **New**. The Session Limit Configuration dialog box will appear.



3. Select the zone where the session limit rule is located.
4. **Configure the limit conditions.**

IP	
Select the **IP** check box to configure the IP limit conditions.	
IP	Select the **IP** radio button and then select an IP address entry. • Select **All IPs** to limit the total number of sessions to all IP addresses. • Select **Per IP** to limit the number of sessions to each IP address.
Source IP	Select the **Source IP** radio button and specify the source IP address entry and destination IP address entry. When the session's source IP and destination IP are both within the specified range, system will limit the number of session as follows: • When you select **Per Source IP**, system will limit the number of sessions to each source IP address. • When you select **Per Destination IP**, system will limit the number of sessions to each destination IP address.
Protocol	
Protocol	Limits the number of sessions to the protocol which has been setted in the textbox.
Application	
Application	Limits the number of sessions to the selected application.

IP	
Role/User/User Group	
Select the **Role/User/User Group** check box to configure the corresponding limit conditions.	
Role	Select the **Role** radio button and a role from the **Role** drop-down list to limit the number of sessions of the selected role.
User	Select the **User** radio button and a user from the **User** drop-down list to limit the number of sessions of the selected user.
User Group	Select the **User Group** radio button and a user group from the **User Group** drop-down list to limit the number of sessions of the selected user group. • Next to the **User Group** radio button, select **All Users** to limit the total number of sessions to all of the users in the user group. • Next to the **User Group** radio button, select **Per User** to limit the number of sessions to each user.
Schedule	
Schedule	Select the **Schedule** check box and choose a schedule you need from the drop-down list to make the session limit rule take effect within the time period specified by the schedule.

5. **Configure the limit types.**

Session Type	
Session Number	Specify the maximum number of sessions. The value range is 0 to 1048576. The value of 0 indicates no limitation.
New Connections/5s	Specify the maximum number of sessions created per 5 seconds. The value range is 1 to 1048576.

6. Click **OK** to save your settings.
7. Click **Switch Mode** to select a matching mode. If you select **Use the Minimum Value** and an IP address matches multiple session limit rules, the maximum number of sessions of this IP address is limited to the minimum number of sessions of all matched session limit rules; if you select **Use the Maximum Value** and an IP address matches multiple session limit rules, the maximum number of sessions of this IP address is the maximum number of sessions of all matched session limit rlules.

Clearing Statistic Information

After configuring a session limit rule, the sessions which exceed the maximum number of sessions will be dropped. You can clear the statistical information of the dropped sessions of specified session limit rule according to your need.

To clear statistic information, take the following steps:

1. Select **Policy > Session Limit**.
2. Select the rule whose session's statistical information you want to clear.
3. Click **Clear**.

ARP Defense

StoneOS provides a series of ARP defense functions to protect your network against various ARP attacks, including:

- ARP Learning: Devices can obtain IP-MAC bindings in an Intranet from ARP learning, and add them to the ARP list. By default this function is enabled. The devices will always keep ARP learning on, and add the learned IP-MAC bindings to the ARP list. If any IP or MAC address changes during the learning process, the devices will add the updated IP-MAC binding to the ARP list. If this function is disabled, only IP addresses in the ARP list can access the Internet.
- MAC Learning: Devices can obtain MAC-Port bindings in an Intranet from MAC learning, and add them to the MAC list. By default this function is enabled. The devices will always keep MAC learning on, and add the learned MAC-Port bindings to the MAC list. If any MAC address or port changes during the learning process, the devices will add the updated MAC-Port binding to the MAC list.
- IP-MAC-Port Binding: If IP-MAC, MAC-Port or IP-MAC-Port binding is enabled, packets that are not matched to the binding will be dropped to protect against ARP spoofing or MAC address list attacks. The combination of ARP and MAC learning can achieve the effect of "real-time scan + static binding", and make the defense configuration more simple and effective.
- Authenticated ARP: Authenticated ARP is implemented on the ARP client Hillstone Secure Defender. When a PC with Hillstone Secure Defender installed accesses the Internet via the interface that enables Authenticated ARP, it will perform an ARP authentication with the device, for the purpose that the MAC address of the device being connected to the PC is trusted.
- ARP Inspection: Devices support ARP Inspection for interfaces. With this function enabled, StoneOS will inspect all ARP packets passing through the specified interfaces, and compare the IP addresses of the ARP packets with the static IP-MAC bindings in the ARP list and IP-MAC bindings in the DHCP Snooping list.
- DHCP Snooping: With this function enabled, system can create a binding relationship between the MAC address of the DHCP client and the allocated IP address by analyzing the packets between the DHCP client and server.
- Host Defense: With this function enabled, the system can send gratuitous ARP packets for different hosts to protect them against ARP attacks.

Configuring ARP Defense

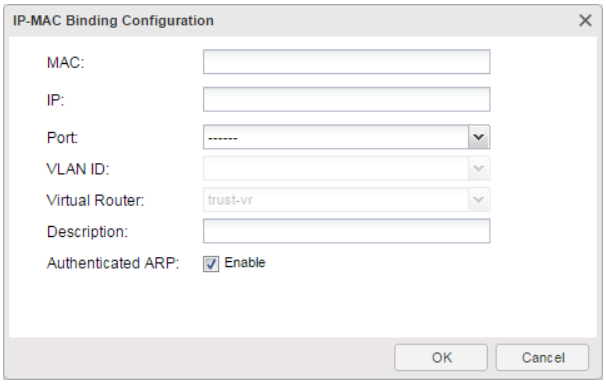
Configuring Binding Settings

Devices support IP-MAC binding, MAC-Port binding and IP-MAC-Port binding to reinforce network security control. The bindings obtained from ARP/MAC learning and ARP scan are known as dynamic bindings, and those manually configured are known as static bindings.

Adding a Static IP-MAC-Port Binding

To add a static IP-MAC-Port binding, take the following steps:

1. Select **Policy > ARP Defense > IP-MAC Binding**.
2. Click **New**.



In the IP-MAC Binding Configuration, configure the corresponding settings.

Option	Description
MAC	Specify a MAC address.
IP	To enable the IP-MAC binding, specify an IP address.
Port	To enable the port binding, select a port from the drop-down list behind.
Virtual Router	Select the virtual router that the binding item belongs to. By default, the binding item belongs to trust-vr.
Description	Specify the description for this item.
Authenticated ARP	Select **Enable** to enable the authenticated ARP function.

3. Click **OK** to save the settings.

Obtaining a Dynamic IP-MAC-Port Bindings

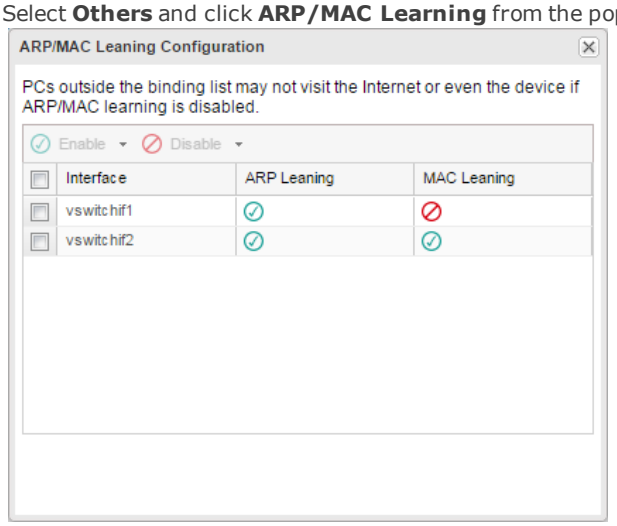
Devices can obtain dynamic IP-MAC-Port binding information from:

- ARP/MAC learning
- IP-MAC scan

To configure the ARP/MAC learning, take the following steps:

1. Select **Policy > ARP Defense > IP-MAC Binding**.

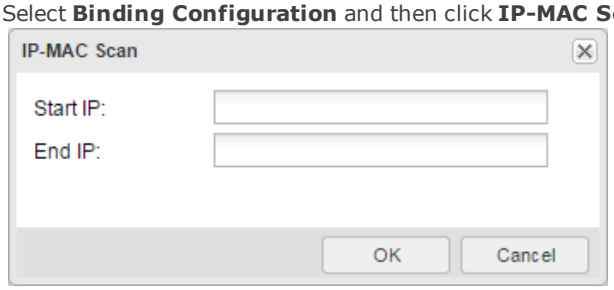
2. Select **Others** and click **ARP/MAC Learning** from the pop-up menu.



3. In the ARP/MAC Learning Configuration dialog box, select the interface that you want to enable the ARP/MAC learning function.
4. Click **Enable** and then select **ARP Learning** or **MAC Learning** in the pop-up menu. The system will enable the selected function on the interface you select.
5. Close the dialog box and return to the IP-MAC Binding tab.

To confiure the ARP scan, take the following steps:

1. Select **Policy > ARP Defense > IP-MAC Binding**.
2. Select **Binding Configuration** and then click **IP-MAC Scan** from the pop-up menu.



3. In the IP-MAC Scan dialog box, enter the start IP and the end IP.
4. Click **OK** to start scanning the specified IP addresses. The result will display in the table in the IP-MAC binding tab.

Bind the IP-MAC-Port Binding Item

To bind the IP-MAC-Port binding item, take the following steps:

1. Select **Policy > ARP Defense > IP-MAC Binding**.
2. Select **Binding Configuration** and then click **Bind All** from the pop-up menu.
3. In the Bind All dialog box, select the binding type.
4. Click **OK** to complete the configurations.

To unbind an IP-MAC-Port binding item:

1. Select **Policy > ARP Defense > IP-MAC Binding**.
2. Select **Binding Configuration** and then click **Unbind All** from the pop-up menu.
3. In the Unbind All dialog box, select the unbinding type.
4. Click **OK** to complete the configurations.

Importing/Exporting Binding Information

To import the binding information, take the following steps:

1. Select **Policy > ARP Defense > IP-MAC Binding**.
2. Select **Others** and then click **Import** from the pop-up menu.
3. In the Import dialog box, click **Browse** to select the file that contains the binding information. Only the UTF-8 encoding file is supported.

To export the binding information, take the following steps:

1. Select **Policy > ARP Defense > IP-MAC Binding**.
2. Select **Others** and then click **Export** from the pop-up menu.
3. Choose the binding information type.
4. Click **OK** to export the binding information to a file.

Configuring Authenticated ARP

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

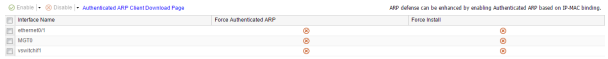
The devices provide Authenticated ARP to protect the clients against ARP spoofing attacks. Authenticated ARP is implemented on the ARP client Hillstone Secure Defender. When a PC with Hillstone Secure Defender installed accesses the Internet via the interface that enables Authenticated ARP, it will perform an ARP authentication with the device to assure the MAC address of the device being connected to the PC is trusted. Besides. The ARP client is also designed with powerful anti-spoofing and anti-replay mechanisms to defend against various ARP attacks.

Note: The Loopback interface and PPPoE sub-interface are not designed with ARP learning, so these two interfaces do not support Authenticated ARP.

To use the Authenticated ARP function, you need to enable the Authenticated ARP function in the device and install the Hillstone Secure Defender in the PCs.

To enable the Authenticated ARP in the device, take the following steps:

1. Select **Policy > ARP Defense > ARP Defense**.
2. Select the interfaces on which you want to enable the Authenticated ARP function.



3. Click **Enable** and select **Force Authenticated ARP** to enable the authenticated ARP function.
4. Enable or disable **Force Install** as needed. If the **Force Install** option is selected, PCs cannot access the Internet via the corresponding interface unless the ARP client has been installed; if the **Force Install** option is not selected, only PCs with the ARP client installed are controlled by Authenticated ARP.

To install Hillstone Secure Defender in the PCs, take the following steps:

1. Enable Authenticated ARP for an interface, and also select the **Force Install** option for the interface.
2. When a PC accesses the Internet via this interface, the Hillstone Secure Defneder's download page will pop up. Download HillstoneSecureDefender.exe as prompted.
3. After downloading, double-click **HillstoneSecureDefender.exe** and install the client as prompted by the installation wizard.

Configuring ARP Inspection

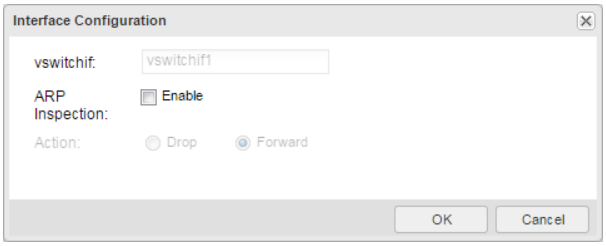
Devices support ARP Inspection for interfaces. With this function enabled, system will inspect all the ARP packets passing through the specified interfaces, and compare the IP addresses of the ARP packets with the static IP-MAC bindings in the ARP list and IP-MAC bindings in the DHCP Snooping list:

- If the IP address is in the ARP list and the MAC address matches, the ARP packet will be forwarded;
- If the IP address is in the ARP list but the MAC address does not match, the ARP packet will be dropped;
- If the IP address is not in the ARP list, continue to check if the IP address is in the DHCP Snooping list;
- If the IP address is in the DHCP Snooping list and the MAC address also matches, the ARP packet will be forwarded;
- If the IP address is in the DHCP Snooping list but the MAC address does not match, the ARP packet will be dropped;
- If the IP address is not in the DHCP Snooping, the ARP packet will be dropped or forwarded according to the specific configuration.

Both the VSwitch and VLAN interface of the system support ARP Inspection. This function is disabled by default.

To configure ARP Inspection of the VSwitch interface, take the following steps:

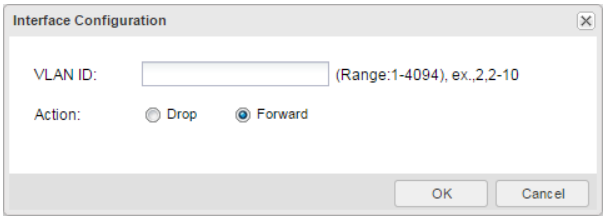
1. Select **Policy > ARP Defense > ARP Inspection**.
2. System already lists the existing VSwitch interfaces.
3. Double-click the item of a VSwitch interface.



4. In the Interface Configuration dialog box, select the **Enable** check box.
5. To drop the traffic whose sender's IP address is not in the ARP table, select **Drop**. To forward the traffic whose sender's IP address is not in the ARP table, select **Forward**.
6. Click **OK** to save the settings and close the dialog box.
7. For the interfaces belonging to the VSwitch interface, you can set the following options:
   - If you do not need the ARP inspection in the interface, in the Advanced Options section, double-click the interface and select **Do Not Inspect** option in the pop-up dialog box.
   - Configure the number of ARP packets received per second. When the ARP packet rate exceeds the specified value, the excessive ARP packets will be dropped. The value range is 0 to 10000. The default value is 0, i.e., no rate limit.
8. Click **OK** to save the settings.

To configure the ARP inspection of the VLAN interface, take the following steps:

1. Select **Policy > ARP Defense > ARP Inspection**.
2. Click **New**.



3. In the Interface Configuration dialog box, specify the VLAN ID.
4. To drop the traffic whose sender's IP address is not in the ARP table, select **Drop**. To forward the traffic whose sender's IP address is not in the ARP table, select **Forward**.
5. Click **OK** to save the settings.

Configuring DHCP Snooping

DHCP, Dynamic Host Configuration Protocol, is designed to allocate appropriate IP addresses and related network parameters for sub networks automatically. DHCP Snooping can create a binding relationship between the MAC address of the DHCP client and the allocated IP address by analyzing the packets between the DHCP client and the server. When ARP Inspection is also enabled, the system will check if an ARP packet passing through can be matched to any binding on the list. If not, the ARP packet will be dropped. In the network that allocates addresses via DHCP, you can prevent against ARP spoofing attacks by enabling ARP inspection and DHCP Snooping.

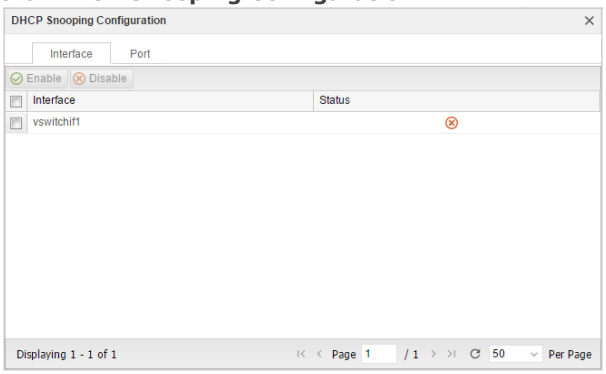
DHCP clients look for the server by broadcasting, and only accept the network configuration parameters provided by the first reachable server. Therefore, an unauthorized DHCP server in the network might lead to DHCP server spoofing attacks. The devices can prevent DHCP server spoofing attacks by dropping DHCP response packets on related ports.

Besides, some malicious attackers send DHCP requests to a DHCP server in succession by forging different MAC addresses, and eventually lead to IP address unavailability to legal users by exhausting all the IP address resources. This kind of attacks is commonly known as DHCP Starvation. The devices can prevent against such attacks by dropping request packets on related ports, setting rate limit or enabling validity check.

The VSwitch interface of the system supports DHCP snooping. This function is disabled by default.

To configure DHCP snooping, take the following steps:

1. Select **Policy > ARP Defense > DHCP Snooping**.
2. Click **DHCP Snooping Configuration**.



3. In the Interface tab, select the interfaces that need the DHCP snooping function.
4. Click **Enable** to enable the DHCP snooping function.

5. In the Port tab, configure the DHCP snooping settings:
   - Validity check: Check if the client's MAC address of the DHCP packet is the same as the source MAC address of the Ethernet packet. If not, the packet will be dropped. Select the interfaces that need the validity check and then click **Enable** to enable this function.
   - Rate limit: Specify the number of DHCP packets received per second on the interface. If the number exceeds the specified value, system will drop the excessive DHCP packets. The value range is 0 to 10000. The default value is 0, i.e., no rate limit. To configure the rate limit, double-click the interface and then specify the value in the **Rate** text box in the pop-up Port Configuration dialog box.
   - Drop: In the Port Configuration dialog box, if the **DHCP Request** check box is selected, the system will drop all of the request packets sent by the client to the server; if the **DHCP Response** check box is selected, system will drop all the response packets returned by the server to the client.
6. Click **OK** to save the settings.

Viewing DHCP Snooping List

With DHCP Snooping enabled, system will inspect all of the DHCP packets passing through the interface, and create and maintain a DHCP Snooping list that contains IP-MAC binding information during the process of inspection. Besides, if the VSwitch, VLAN interface or any other Layer 3 physical interface is configured as a DHCP server, the system will create IP-MAC binding information automatically and add it to the DHCP Snooping list even if DHCP Snooping is not enabled. The bindings in the list contain information like legal users' MAC addresses, IPs, interfaces, ports, lease time, etc.

To view the DHCP snooping list, take the following steps:

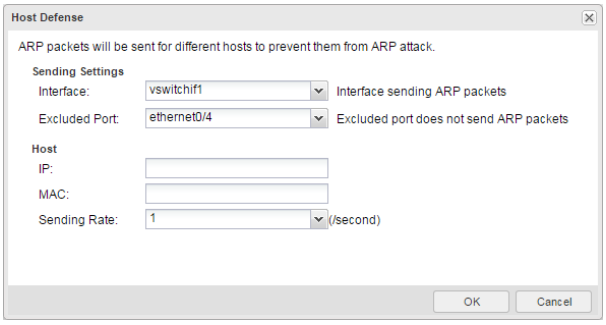
1. Select **Policy > ARP Defense > DHCP Snooping**.
2. In the current page, you can view the DHCP snooping list.

Configuring Host Defense

Host Defense is designed to send gratuitous ARP packets for different hosts to protect them against ARP attacks.

To configure host defense, take the following steps:

1. Select **Policy > ARP Defense > Host Defense**.
2. Click **New**.



In the Host Defense dialog box, configure the corresponding options.

Sending Settings	
Interface	Specify an interface that sends gratuitous ARP packets.
Excluded Port	Specify an excluded port, i.e., the port that does not send gratuitous ARP packets. Typically it is the port that is connected to the proxied host.
Host	
IP	Specify the IP address of the host that uses the device as a proxy.

Sending Settings	
MAC	Specify the MAC address of the host that uses the device as a proxy.
Sending Rate	Specify a gratuitous ARP packet that sends rate. The value range is 1 to 10/sec. The default value is 1.

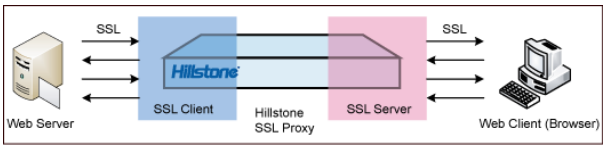
3. Click **OK** to save your settings and return to the Host Defense page.
4. Repeat Step 2 and Step 3 to configure gratuitous ARP packets for more hosts. You can configure the device to send gratuitous ARP packets for up to 16 hosts.

SSL Proxy

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

To assure the security of sensitive data when being transmitting over networks, more and more websites adopt SSL encryption to protect their information. The device provides the SSL proxy function to decrypt HTTPS traffic. The SSL proxy function works in the following two scenarios:

The first scenario, the device works as the gateway of Web clients. The SSL proxy function replaces the certificates of encrypted websites with the SSL proxy certificate to get the encrypted information and send the SSL proxy certificates to the client's Web browser. During the process, the device acts as a SSL client and SSL server to establish connections to the Web server and Web browser respectively. The SSL proxy certificate is generated by using the device's local certificate and re-signing the website certificate. The process is described as below:



The second scenario, the device works as the gateway of Web servers. The device with SSL proxy enabled can work as the SSL server, use the certificate of the Web server to establish the SSL connection with Web clients (Web browsers), and send the decrypted traffic to the internal Web server.

Work Mode

There are three work modes. For the first scenario, the SSL proxy function can work in the Require mode and the Exempt mode; for the second scenario, the SSL proxy function can work in the Offload mode.

When the SSL proxy function works in the Require mode and the Exempt mode, it can perform the SSL proxy on specified websites.

For the websites that do not need SSL proxy, it dynamically adds the IP address and port of the websites to a bypass list, and the HTTPS traffic will be bypassed.

For the websites proxied by the SSL proxy function, the device will check the parameters of the SSL negotiation. When a parameter matches an item in the checklist, the corresponding HTTPS traffic can be blocked or bypassed according to the action you specified.

- If the action is Block, the HTTPS traffic will be blocked by the device.
- If the action is Bypass, the HTTPS traffic will not be decrypted. Meanwhile, the device will dynamically add the IP address and port number of the Website to the bypass list, and the HTTPS traffic will be bypassed.

The device will decrypt the HTTPS traffic that is not blocked or bypassed.

When the SSL proxy function works in the Offload mode, it will proxy the SSL connections initialized by Web clients, decrypt the HTTPS traffic, and send the HTTPS traffic as plaintext to the Web server.

You can integrate SSL proxy function with the following:

- Integrate with the application identification function. Devices can decrypt the HTTPS traffic encrypted using SSL by the applications and identify the application. After the application identification, you can configure the policy rule, QoS, session limit, policy-based route.
- Support unilateral SSL proxy in WebAuth. SSL client can use SSL connection during authentication stage. When authentication is completed, SSL proxy will no longer take effect, and the client and server communicate directly without SSL encryption.
- Integrate with AV, IPS, and URL. Devices can perform the AV protection, IPS protection, and URL filter on the decrypted HTTPS traffic.

Working as Gateway of Web Clients

To implement the SSL proxy, you need to bind a SSL proxy profile to the policy rule. After binding the SSL proxy profile to a policy rule, system will use the SSL proxy profile to deal with the traffic that matches the policy rule. To implement

the SSL proxy, take the following steps:

1. Configure the corresponding parameters of SSL negotiation, including the following items: specify the PKI trust domain of the device certificates, obtain the CN value of the subject field from the website certificate, configure the trusted SSL certificate list, and import a device certificate to the Web browser.
2. Configure a SSL proxy profile, including the following items: choose the work mode, set the website list (use the CN value of the Subject field of the website certificate), configure the actions to the HTTPS traffic when its SSL negotiation matches the item in the checklist, enable the audit warning page, and so on.
3. Bind a SSL proxy profile to a proper policy rule. The device will decrypt the HTTPS traffic that matches the policy rule and is not blocked or bypassed by the device.

Configuring SSL Proxy Parameters

Configuring SSL proxy parameters includes the following items:

- Specify the PKI trust domain of the device certificate
- Obtain the CN value of the website certificate
- Configure a trusted SSL certificate list
- Import a device certificate to a Web browser

Specifying the PKI Trust Domain of Device Certificate

By default, the certificate of the default trust domain trust_domain_ssl_proxy_2048 will be used to generate the SSL proxy certificate with the Web server certificate together, and then system will issue the generated SSL proxy certificate to the client. You can specify another PKI trust domain in system as the trust domain of the device certificate. The specified trust domain must have a CA certificate, local certificate, and the private key of the local certificate. To specify a trust domain, take the following steps:

1. Click **Policy > SSL Proxy**.
2. At the top-right corner of the page, click **Trust Domain Configuration**.
3. Select a trust domain from the Trust domain drop-down list.
   - The trust domain of trust_domain_ssl_proxy uses RSA and the modulus size is 1024 bits.
   - The trust domain of trust_domain_ssl_proxy_2048 uses RSA and the modulus size is 2048 bits.
4. Click **OK** to save the settings.

Obtaining the CN Value

To get the CN value in the Subject field of the website certificate, take the following steps (take www.gmail.com as the example):

1. Open the IE Web browser, and visit https://www.gmail.com.
2. Click the **Security Report** button () next to the URL.
3. In the pop-up dialog box, click **View certificates**.
4. In the Details tab, click **Subject**. You can view the CN value in the text box.

Configuring a Trusted SSL Certificate List

The trusted SSL certificate list contains the well-known CA certificates in the industry, which are used to verify the validity of site certificates. For the valid certificates, system will send a SSL proxy certificate to the client browser; however, for the invalid certificates, system will send an internal certificate to the browser to inform you that the certificate of the website is invalid. You can import one or multiple trusted SSL certificates, or delete the specified trusted SSL certificate.

1. Click **Policy > SSL Proxy**.
2. At the top-right corner of the page, click **Trust SSL Certificate Configuration**.
   - In the pop-up dialog box, click **Import** to import a certificate.
   - In the pop-up dialog box, select a certificate and then click **Delete** to delete the selected certificate.
3. After the configurations, click **Close** to close the dialog box.

Importing Device Certificate to Client Browser

In the proxy process, the SSL proxy certificate will be used to replace the website certificate. However, there is no SSL proxy certificate's root certificate in the client browser, and the client cannot visit the proxy website properly. To address this problem, you have to import the root certificate (certificate of the device) to the browser.

To export the device certificate to local PC firstly, take the following steps:

1. Export the device certificate to local PC. Select **System > PKI**.
2. In the Management tab in the PKI Management dialog box, configure the options as below:
   - Trust domain: trust_domain_ssl_proxy or trust_domain_ssl_proxy_2048
   - Content: CA certificate
   - Action: Export
3. Click **OK** and select the path to save the certificate. The certificate will be saved to the specified location.

Then, import the device certificate to the client browser. Take Internet Explorer as an example:

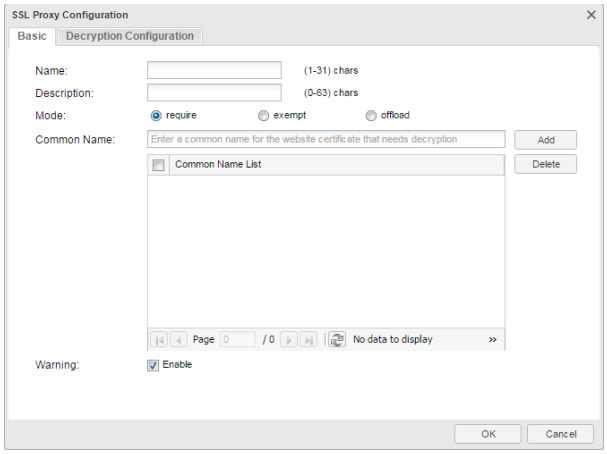
1. Open IE.
2. From the toolbar, select **Tools > Internet** Options.
3. In the **Content** tab, click **Certificates**.
4. In the Certificates dialog box, click the **Trusted Root Certification Authorities** tab.
5. Click **Import**. Import the certificate following the Certificate Import Wizard.

Configuring a SSL Proxy Profile

Configuring a SSL proxy profile includes the following items: choose the work mode, set the website list (use the CN value of the Subject field of the website certificate), configure the actions to the HTTPS traffic when its SSL negotiation matches the item in the checklist, enable the audit warning page, and so on. System supports up to 32 SSL proxy profiles and each profile supports up to 10,000 statistic website entries.

To configure a SSL proxy profile, take the following steps:

1. Click **Policy > SSL Proxy**.
2. At the top-left corner, click **New** to create a new SSL proxy profile.



In the Basic tab, configure the settings.

Option	Description
Name	Specify the name of the SSL proxy profile.
Description	Add the description.
Mode	When the device works as the gateway of Web clients, the SSL proxy function can work in the Require mode or the Exempt mode. • In the Require mode, the device perform the SSL proxy function on the communication encrypted by the specified website certificate. The communication encrypted by other website certificates will be bypassed. • In the Exempt mode, the device does not perform the SSL proxy function on the communication encrypted by the specified website certificate. The communication encrypted by other website certificates will be proxied by SSL proxy function.
Common Name	Set the website list based on the work mode. When the SSL proxy is in the Require mode, set the websites that will be proxied by the SSL proxy function. When the SSL proxy is in the Exempt mode, set the websites that will not be proxied by the SSL proxy function and the device will perform the SSL proxy on other websites. To set the website list, specify the CN value of the subject field of the website certificate and then click **Add**.
Warning	Select **Enable** to enable the warning page. When the HTTPS traffic is decrypted by the SSL proxy function, the request to a HTTPS website will be redirected to a warning page of SSL proxy. In this page, system notifies the users that their access to HTTPS websites are being monitored and asks the users to protect their privacy.

In the Decryption Configuration tab, configure the settings.

Option	Description
After system completes the SSL negotiation, the traffic that is not blocked or bypassed will be decrypted. When the parameters match multiple items in the checklist and you configure difference actions to different items, the Block action will take effect. The corresponding HTTPS traffic will be blocked.	
Key Modulus	Specify the key pair modulus size of the private/public keys that are associated with the SSL proxy certificate. You can select 1024 bits or 2048 bits.

Option	Description
Server certificate check	
Expired certificate	Check the certificate used by the server. When the certificate is overdue, you can select **Block** to block its HTTPS traffic, or select **Bypass** to bypass its HTTPS traffic, or select **Decrypt** to decrypt the HTTPS traffic.
Encryption mode check	
Unsupported version	Check the SSL protocol version used by the server. • When system does not support the SSL protocol used by the SSL server, you can select **Block** to block its HTTPS traffic, or select **Bypass** to bypass its HTTPS traffic. • When system supports the SSL protocol used by the SSL server, it will continue to check other items.
Unsupported encryption algorithms	Check the encryption algorithm used by the server. • When system does not support the encryption algorithm used by the SSL server, you can select **Block** to block its HTTPS traffic, or select **Bypass** to bypass its HTTPS traffic. • When system supports the encryption algorithm used by the SSL server, it will continue to check other items.
Client verification	Check whether the SSL server verifies the client certificate. • When the SSL server verifies the client certificate, you can select **Block** to block its HTTPS traffic, or select **Bypass** to bypass its HTTPS traffic. • When the SSL server does not verify the client certificate, it will continue to check other items.
Blocking SSL version	When the SSL server uses the specified version of SSL protocol, system can block its HTTPS traffic.
Blocking encryption algorithm	When the SSL server uses the specified encryption algorithm, system can block its HTTPS traffic.
Resource unavailable	When the decryption resource is not enough, system will bypass the HTTPS traffic. This action cannot be changed.

3. Click **OK** to save the settings.

Working as Gateway of Web Servers

To implement SSL proxy, you need to bind a SSL proxy profile to the policy rule. After binding the SSL proxy profile to a policy rule, system will use the SSL proxy profile to deal with the traffic that matches the policy rule. To implement SSL proxy, take the following steps:

1. Configure a SSL proxy profile includes the following items: choose the work mode, specify the trust domain of the Web server certificate and the HTTP port number of the Web server.
2. Bind a SSL proxy profile to a proper policy rule. The device will decrypt the HTTPS traffic that matches the policy rule.

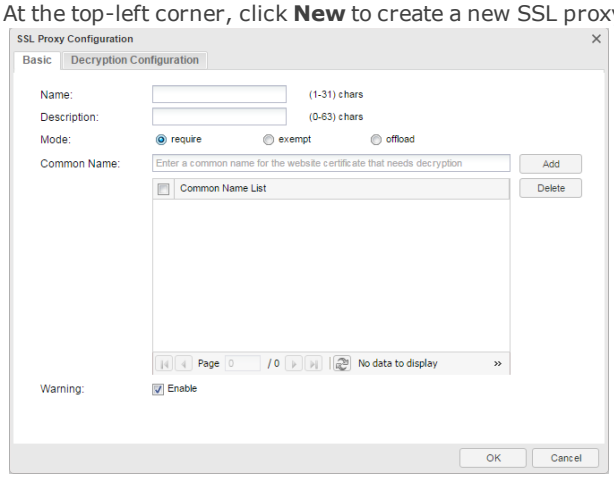
Configuring a SSL Proxy Profile

Configuring a SSL proxy profile includes the following items: choose the work mode, specify the trust domain of the Web server certificate and the HTTP port number of the Web server.

To configure a SSL proxy profile, take the following steps:

1. Click **Policy > SSL Proxy**.

2. At the top-left corner, click **New** to create a new SSL proxy profile.



In the Basic tab, configure the settings.

Option	Description
Name	Specify the name of the SSL proxy profile.
Description	Add the description.
Mode	When the device works as the gatetway of Web servers, the SSL proxy function can work in the Offload mode.
Service Port	Specify the HTTP port number of the Web server.
Server Trust Domain	Since the device will work as the SSL server and use the certificate of the Web server to establish the SSL connection with Web clients (Web browsers), you need to import the certificate and the key pair into a trust domain in the device. For more information about importing the certificate and the key pair, see "PKI" on Page 112. After you complete the importing, select the trust domain used by this SSL Profile.
Warning	Select **Enable** to enable the warning page. When the HTTPS traffic is decrypted by the SSL proxy function, the request to a HTTPS website will be redirected to a warning page of SSL proxy. In this page, system notifies the users that their access to HTTPS websites are being monitored and asks the users to protect their privacy.

3. Click **OK** to save the settings.

Binding a SSL Proxy Profile to a Policy Rule

After binding the SSL proxy profile to a policy rule, system will process the traffic that is matched to the rule according to the profile configuration. To bind the SSL proxy profile to a policy rule, see "Security Policy" on Page 281.

Global Blacklist

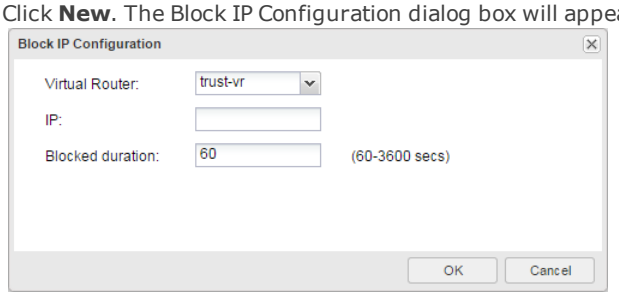
After adding the IP addresses or services to the global blacklist, system will perform the block action to the IP address and service until the block duration ends. You can manually add IP addresses or services to the blacklist and system can also automatically add the IP addresses or services to the blacklist after you configure the IPS module.

Configuring global blacklist includs IP block settings and service block settings.

Configuring IP Block Settings

To configure the IP block settings, take the following steps:

1. Select **Policy > Global Blacklist > IP Block**.
2. Click **New**. The Block IP Configuration dialog box will appear.



Configure the corresponding options.

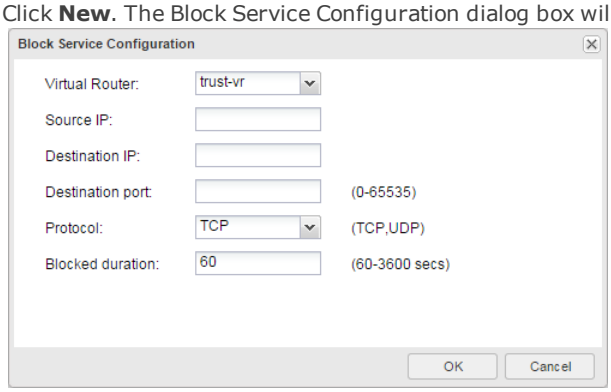
Option	Description
Virtual Router	Selects the virtual router that the IP address belongs to.
IP	Types the IP address that you want to block. This IP address can be not only the source IP address, but also the destination IP address.
Blocked Duration	Types the duration that the IP address will be blocked. The unit is second. The value ranges from 60 to 3600. The default value is 60.

3. Click **OK** to save the settings.

Configuring Service Block Settings

To configure the service block settings, take the following steps:

1. Select **Policy > Global Blacklist > Service Block**.
2. Click **New**. The Block Service Configuration dialog box will appear.



Configure the corresponding options.

Option	Description
Virtual Router	Selects the virtual router that the IP address belongs to.
Source IP	Types the source IP address of the blocked service. The service block function will block the service from the source IP address to the destination IP address.
Destination IP	Types the destination IP address of the blocked service.
Port	Types the port number of the blocked service.
Protocol	Selects the protocol of the blocked service.
Blocked Duration	Types the duration that the IP address will be blocked. The unit is second. The value ranges from 60 to 3600. The default value is 60.

3. Click **OK** to save the settings.

Chapter 9 Threat Prevention

Threat prevention is a device that can detect and block network threats. By configuring the threat prevention function, Hillstone devices can defend network attacks and reduce losses of the internal network.

Threat protections include:

- Anti Virus: It can detect the common file types and protocol types which are most likely to carry the virus and protect the network from them.. Hillstone devices can detect protocol types of POP3, HTTP, SMTP, IMAP4 and FTP, and the file types of archives (including GZIP, BZIP2, TAR, ZIP and RAR-compressed archives), PE , HTML, MAIL, RIFF and JPEG.
- Intrusion Prevention: It can detect and protect mainstream application layer protocols (DNS, FTP, POP3, SMTP, TELNET, MYSQL, MSSQL, ORACLE, NETBIOS), against web-based attacks and common Trojan attacks.
- Attack Defense: It can detect various types of network attacks, and take appropriate actions to protect the Intranet against malicious attacks, thus assuring the normal operation of the Intranet and systems.
- Perimeter Traffic Filtering: It can filter the perimeter traffic based on known IP of black/white list, and take block action on the malicious traffic that hits the blacklist.
- Botnet C&C Prevention: It can detect botnet host in the internal network timely, as well as locate and take other actions according to the configuration, so as to avoid further threat attacks.

The threat protection configurations are based on security zones and policies.

- If a security zone is configured with the threat protection function, system will perform detection on the traffic that is matched to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the threat protection function, system will perform detection on the traffic that is matched to the policy rule you specified, and then respond.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the threat protection configurations in a destination zone is superior to that in a source zone if specified at the same time.

Note:

- Currently, you can only enable the Anti Virus and Intrusion Prevention function based on policies.
- Threat protection is controlled by a license. To use Threat protection, apply and install the Threat Protection(TP) license, 、Anti Virus(AV) license orIntrusion Prevention System (IPS) license.

Threat Protection Signature Database

The threat protection signature database includes a variety of virus signatures, Intrusion prevention signatures, Perimeter traffic filtering signatures, . By default system updates the threat protection signature database everyday automatically. You can change the update configuration as needed. Hillstone devices provide two default update servers: update1.hillstonenet.com and update2.hillstonenet.com. Hillstone devices support auto updates and local updates.

According to the severity, signatures can be divided into three security levels: critical, warning and informational. Each level is described as follows:

- Critical: Critical attacking events, such as buffer overflows.
- Warning: Aggressive events, such as over-long URLs.
- Informational: General events, such as login failures.

Anti Virus

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

The system is designed with an Anti-Virus that is controlled by licenses to provide an AV solution featuring high speed, high performance and low delay. With this function configured in StoneOS, Hillstone devices can detect various threats including worms, Trojans, malware, malicious websites, etc., and proceed with the configured actions.

Anti Virus function can detect the common file types and protocol types which are most likely to carry the virus and protect the network from them. Hillstone devices can detect protocol types of POP3, HTTP, SMTP, IMAP4 and FTP, and the file types of archives (including GZIP, BZIP2, TAR, ZIP and RAR-compressed archives), PE , HTML, MAIL, RIFF and JPEG.

If IPv6 is enabled, Anti Virus function will detect files and protocols based on IPv6. How to enable IPv6, see StoneOS_CLI_User_Guide_IPv6.

The virus signature database includes over 10,000 signatures, and supports both daily auto update and real-time local update. See "Security Policy" on Page 281.

Note: Anti Virus is controlled by license. To use Anti Virus, apply and install the Anti Virus (AV) license.

Configuring Anti-Virus

This chapter includes the following sections:

- Preparation for configuring Anti-Virus function
- Configuring Anti-Virus function
- Configuring Anti-Virus global parameters

Preparing

Before enabling Anti-Virus, make the following preparations:

1. Make sure your system version supports Anti-Virus.
2. Import an Anti-Virus license and reboot. The Anti-Virus will be enabled after the rebooting.

Note:

- You need to update the Anti-Virus signature database before enabling the function for the first time. To assure a proper connection to the default update server, you need to configure a DNS server for StoneOS before updating.
- Except M8860/M8260/M7860/M7360/M7260, if Anti-Virus is enabled, the max amount of concurrent sessions will decrease by half.

Configuring Anti-Virus Function

The Anti-Virus configurations are based on security zones or policies.

- If a security zone is configured with the Anti-Virus function, system will perform detection on the traffic that is matched to the binding zone specified in the rule, and then do according to what you specified.
- If a policy rule is configured with the threat protection function, system will perform detection on the traffic that is matched to the policy rule you specified, and then respond.
- The threat protection configurations in a policy rule is superior to that in a zone rule if specified at the same time, and the threat protection configurations in a destination zone is superior to that in a source zone if specified at the same time.

To realize the zone-based Anti-Virus, take the following steps:

1. Create a zone. For more information, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Threat Protection tab.
3. Enable the threat protection you need and select an Anti-Virus rule from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list. To creat an Anti-Virus rule, see Configuring_Anti-Virus_Rule.
4. Click **OK** to save the settings.

To realize the policy-based Anti-Virus, take the following steps:

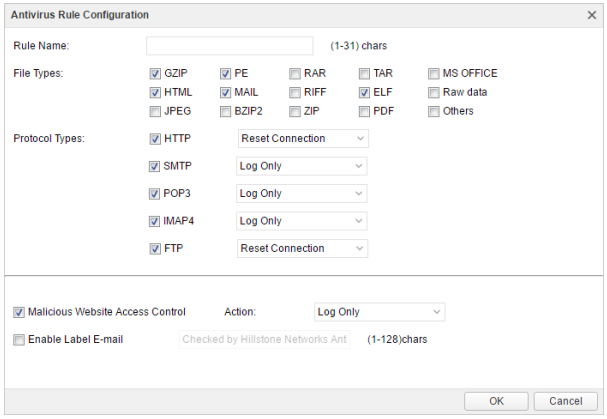
1. Create a security policy rule. For more information, refer to "Security Policy" on Page 281.
2. In the Policy Configuration dialog box, select the Protection tab.

3. Select the **Enable** check box of **Antivirus**. Then select an Anti-Virus rule from the Profile drop-down list, or you can click **Add Profile** from the Profile drop-down list to create an Anti-Virus rule. For more information, see Configuring_Anti-Virus_Rule.
4. Click **OK** to save the settings.

Configuring an Anti-Virus Rule

To configure an Anti-Virus rule, take the following steps:

1. Select **Object > Antivirus > Profile**.
2. Click **New**.



In the Anti-Virus Rules Configuration dialog box, enter the Anti-Virus rule configurations.

Option	Description
Rule Name	Specifies the rule name.
File Types	Specifies the file types you want to scan. It can be GZIP, JPEG, MAIL, RAR, HTML .etc
Protocol Types	Specifies the protocol types (HTTP, SMTP, POP3, IMAP4, FTP) you want to scan and specifies the action the system will take after the virus is found. • Fill Magic - Processes the virus file by filling magic words, i.e., fills the file with the magic words (Virus is found, cleaned) from the beginning to the ending part of the infected section. • Log Only - Only generates log. • Warning - Pops up a warning page to prompt that a virus has been detected. This option is only effective to the messages transferred over HTTP. • Reset Connection - If virus has been detected, system will reset connections to the files.
Malicious Website Access Control	Select the check box behind Malicious Website Access Control to enable the function.
Action	Specifies the action the system will take after the malicious website is found. • Log Only - Only generates log. • Reset Connection - If a malicious website has been detected, system will reset connections to the files. • Return to the Alarm Page - Pops up a warning page to prompt that a malicious website has been detected.This option is only effective to the messages transferred over HTTP.
Enable label e-mail	If an email transferred over SMTP is scanned, you can enable label email to scan the email and its attachment(s). The scanning results will be included in the mail body, and sent with the email. If no virus has been detected, the message of "No virus found" will be labeled; otherwise information related to the virus will be displayed in the email, including the filename, result and action. Type the end message content into the box. The range is 1 to 128.

3. Click **OK**.

Note: By default, according to virus filtering protection level, system comes with three default virus filtering rules: predef_low, predef_middle, predef_high. The default rule is not allowed to edit or delete.

Configuring Anti-Virus Global Parameters

To configure the AV global parameters, take the following steps:

1. Select **Object > Antivirus > Configuration**.

In AV Global Configuration section, enter the AV global configurations.

Option	Description
Antivirus	Select/clear the Enable check box to enable/disable Anti-Virus.
Max Decompression Layer	By default StoneOS can scan the files of up to 5 decompression layers. To specify a decompression layer, select a value from the drop-down list. The value range is 1 to 5.
Exceed Action	Specifies an action for the compressed files that exceed the max decompression layer. Select an action from the drop-down list: • Log Only - Only generates logs but will not scan the files. This action is enabled by default. • Reset Connection - If a virus has been detected, StoneOS will reset connections for the files.
Encrypted Compressed File	Specifies an action for encrypted compressed files: • ------ - Will not take any special anti-virus actions against the files, but might further scan the files according to the configuration. • Log Only - Only generates logs but will not scan the files. • Reset Connection - Resets connections for the files.

2. Click **OK**.

Intrusion Prevention System

IPS, Intrusion Prevention System, is designed to monitor various network attacks in real time and take appropriate actions (like block) against the attacks according to your configuration.

The IPS can implement a complete state-based detection which significantly reduces the false positive rate. Even if the device is enabled with multiple application layer detections, enabling IPS will not cause any noticeable performance degradation. Besides, StoneOS will update the signature database automatically everyday to assure its integrity and accuracy.

- IPS will support IPv6 address if the IPv6 function is enabled.

The protocol detection procedure of IPS consists of two stages: signature matching and protocol parse.

- Signature matching: IPS abstracts the interested protocol elements of the traffic for signature matching. If the elements are matched to the items in the signature database, system will process the traffic according to the action configuration. This part of detection is configured in the **Select Signature** section.
- Protocol parse: IPS analyzes the protocol part of the traffic. If the analysis results show the protocol part containing abnormal contents, system will process the traffic according to the action configuration. This part of detection is configured in the **Protocol Configuration** section.

Note: Intrusion Prevention System is controlled by a license. To use Threat protection, apply and install the Intrusion Prevention System (IPS) license.

Signatures

The IPS signatures are categorized by protocols, and identified by a unique signature ID. The signature ID consists of two parts: protocol ID (1st bit or 1st and 2nd bit) and attacking signature ID (the last 5 bits). For example, in ID 605001, "6" identifies a Telnet protocol, and "00120" is the attacking signature ID. The 1st bit in the signature ID identifies protocol anomaly signatures, while the others identify attacking signatures. The mappings between IDs and protocols are shown in the table below:

ID	Protocol	ID	Protocol	ID	Protocol	ID	Protocol
1	DNS	7	Other-TCP	13	TFTP	19	NetBIOS
2	FTP	8	Other-UDP	14	SNMP	20	DHCP
3	HTTP	9	IMAP	15	MySQL	21	LDAP
4	POP3	10	Finger	16	MSSQL	22	VoIP
5	SMTP	11	SUNRPC	17	Oracle	-	-
6	Telnet	12	NNTP	18	MSRPC	-	-

In the above table, Other-TCP identifies all the TCP protocols other than the standard TCP protocols listed in the table, and Other-UDP identifies all the UDP protocols other than the standard UDP protocols listed in the table.

Configuring IPS

This chapter includes the following sections:

- Preparation for configuring IPS function
- Configuring IPS function

Preparation

Before enabling IPS, make the following preparations:

1. Make sure your system version supports IPS.
2. Import an Intrusion Prevention System (IPS) license and reboot. The IPS will be enabled after the rebooting.

Note: Except M8860/M8260/M7860/M7360/M7260, if IPS is enabled, the max amount of concurrent sessions will decrease by half.

Configuring IPS Function

The IPS configurations are based on security zones or policies.

To realize the zone-based IPS, take the following steps:

1. Create a zone. For more information, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog box, select Threat Protection tab.
3. Enable the IPS you need and select an IPS rules from the profile drop-down list below, or you can click **Add Profile** from the profile drop-down list below. To creat an IPS rule, see Configuring_an_IPS_Rule.
4. Click a direction (Inbound, Outbound, Bi-direction). The IPS rule will be applied to the traffic that is matched with the specified security zone and direction.

To realize the policy-based IPS, take the following steps:

1. Create a policy rule. For more inform action, refer to "Security Policy" on Page 281.
2. In the Policy Configuration dialog box, select the Protection tab.
3. Select the **Enable** check box of **IPS**. Then select an IPS rule from the Profile drop-down list, or you can click **Add Profile** from the Profile drop-down list to creat an IPS rule. For more information, see Configuring_an_IPS_Rule.
4. Click **OK** to save the settings.

Configuring an IPS Rule

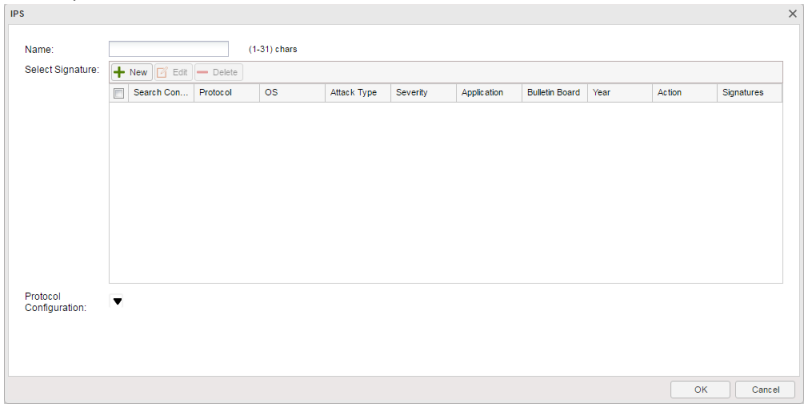
System has three default IPS rules: **predef_default** , **predef_loose** and **predef_critical**.

- The **predef_default** rule includes all the IPS signatures and its default action is reset.
- The **predef_loose** includes all the IPS signatures and its default action is log only.
- The **predef_critical** includes all the IPS signatures with high severity and its default action is log only.

To configure an IPS rule, take the following steps:

1. Select **Object > Intrusion Prevention System > Profile**.

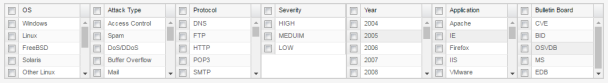
2. Click **New** to create a new IPS rule. To edit an existing one, select the check box of this rule and then click **Edit**. To view it, click the name of this rule.

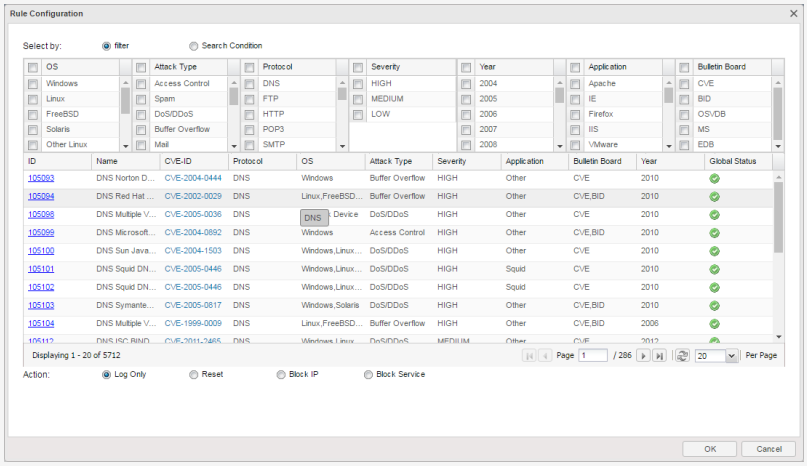
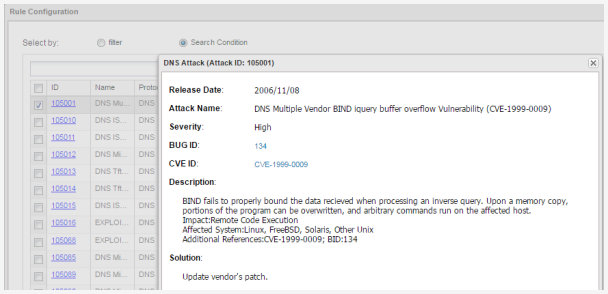


3. Type the name into the Rule name box.

4. In the **Select Signature** area, the existing signature sets and their settings will be displayed in the table. Select the desired signature sets. You can also manage the signature sets, including New, Edit, and Delete.

Click New to create a new signature set rule.

Option	Description
Creating a new signature set contains: • Select By: Select the method of how to choose the signature set. There are two methods: **Filter** and **Search Condition**. • Action: Specify the action performed on the abnormal traffic that match the signature set.	
Select By	
Filter	System categorizes the signatures according to the following aspects (aka main categories): affected OS, attack type, protocol, severity, released year, affected application, and bulletin board. A signature can be in several subcategories of one main category. For example, the signature of ID 105001 is in the Linux subcategory, the FreeBSD subcategory, and Other Linux subcategory at the same time.  With Filter selected, system displays the main categories and subcategories above. You can select the subcategories to choose the signatures in this subcategory. As shown below, after selecting the Web Attack subcategory in the Attack Type main category, system will choose the signatures related to this subcategory. To view the detailed information of these chosen signatures, you can click the ID in the table.

Option	Description
	 When selecting main category and subcategory, note the following matters: • You can select multiple subcategories of one main category. The logic relation between them is OR. • The logic relation between each main category is AND. • For example, you have selected Windows and Linux in OS and select HIGH in Severity. The chosen signatures are those whose severity is high and meanwhile whose affected operating system is either Windows or Linux.
Search Condition	Enter the information of the signatures and press Enter to search the signatures. System will perform the fuzzy matching in the following field: attack ID, attack name, description, and CVE-ID.  In the search results displayed in the table, select the check box of the desired signatures. Then click > to add them to the right pane. The ID displayed in the right pane are the ones that are included in this signature set. To add all signatures in the left to the right, click >>. Use < or << to cancel the selected signatures or all signatures in the right.
Action	
Log Only	Record a log.

Option	Description
Reset	Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs.
Block IP	Block the IP address of the attacker. Specify a block duration. The value range is 60 to 3600 seconds, and the default value is 60.
Block Service	Block the service of the attacker. Specify a block duration. The value range is 60 to 3600 seconds, and the default value is 60.
Note: You create several signature sets and some of them contain a particular signature. If the actions of these signature sets are different and the attack matches this particular signature , system will adopt the following rules: • Always perform the stricter action on the attack. The signature set with stricter action will be matched. The strict level is: Block IP > Block Service > Rest > Log Only. If one signature set is Block IP with 15s and the other is Block Service with 30s, the final action will be Block IP with 30s. • The action of the signature set created by Search Condition has higher priority than the action of the signature set created by Filter.	

5. Click **OK** to complete signature set configurations.

6. In the Protocol Configuration area, click ▼. The protocol configurations specify the requirements that the protocol part of the traffic must meet. If the protocol part contains abnormal contents, system will process the traffic according to the action configuration. System supports the configurations of HTTP, DNS, FTP, MSRPC, POP3, SMTP, SUNRPC, and Telnet.

In the HTTP tab, select the Protocol tab, and configure the following settings:

Option	Description
HTTP	**Max Scan Length**: Specify the maximum length of scanning when scanning the HTTP packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the HTTP packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Banner Detection**: Select the Enable check box to enable protection against HTTP server banners. • Banner information - Type the new information into the box that will replace the original server banner information. **Max URI Length**: Specify a max URI length for the HTTP protocol. If the URI length exceeds the limitation, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Allowed Methods**: Specify the allowed HTTP methods.

To protect the Web server, select Web Server in the HTTP tab.

Protecting the Web server means system can detect the following attacks: SQL injection, XSS injection, external

link check, ACL, and HTTP request flood and take actions when detecting them. A pre-defined Web server protection rule named **default** is built in. By default, this protection rule is enabled and cannot be disabled or deleted.

Configure the following settings to protect the Web server:

Option	Description
Name	Specify the name of the Web server protection rule.
Configure Domain	Specify domains protected by this rule. Click the link and the Configure Domain dialog box will appear. Enter the domain names in the **Domain** text box. At most 5 domains can be configured. The traffic to these domains will be checked by the protection rule. The domain name of the Web server follows the longest match rule from the back to the front. The traffic that does not match any rules will match the default Web server. For example, you have configured two protection rules: **rule1 and rule2**. The domain name in rule1 is abc.com. The domain name in rule2 is email.abc.com. The traffic that visits news.abc.com will match rule1, the traffic that visits www.email.abc.com will match rule2, and the traffic that visits www.abc.com.cn will match the default protection rule.
CC URL Limit	Select the Enable check box to enable the Web Server CC URL Restriction feature. When this function is enabled, system will block the traffic of this IP address , whose access frequency exceeds the threshold. ◦ Threshold: Specifies the maximum number of times a single source IP accesses the URL path per minute. When the frequency of a source IP address exceeds this threshold, system will block the flow of the IP. The value ranges from 1 to 65535 times per minute. ◦ Block IP duration: Specifies the time to block IP. The default is 60 seconds, in the range of 60 to 3600 seconds. Over this time, system will release the blocked IP, this IP can re-visit the Web server. ◦ URL Path:Click the link and the Configure URL Path dialog appears. Enter the URL path in the **URL** text box to add or delete. After the configuration, all paths that contain the name of the path are also counted. System accesses the frequency statistics for HTTP requests that access these paths. If the access frequency of the HTTP request exceeds the threshold, the source IP of the request is blocked, and the IP will not be able to access the Web server. For example: configure'/home/ab', system will perform a frequency check on the 'access/home/ab/login' and '/home/BC/login' HTTP requests. URL path does not support the path format which contains the host name or domain name, for example:you can not configure www.baidu.com/home/login.html,you should configure '/ home / login.html', and 'www.baidu.com' should be configured in the corresponding Web server domain name settings. You can configure up to 32 URL paths. The length of each path is in the range of 1-255 characters.
SQL Injection Protection	Select the Enable check box to enable SQL injection check.

Option	Description
	• Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. • Sensitivity: Specifies the sensitivity for the SQL injection protection function. The higher the sensitivity is, the lower the false negative rate is. • Check point: Specifies the check point for the SQL injection check. It can be Cookie, Cookie2, Post, Referer or URI.
XSS Injection Protection	Select the Enable check box to enable XSS injection check for the HTTP protocol. • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. • Sensitivity: Specifies the sensitivity for the XSS injection protection function. The higher the sensitivity is, the lower the false negative rate is. • Check point: Specifies the check point for the XSS injection check. It can be Cookie, Cookie2, Post, Referer or URI.
External Link Check	Select the Enable check box to enable external link check for the Web server. This function controls the resource reference from the external sites. • External link exception: Click this link, and the External Link Exception Configuration dialog box will appear. All the URLs configured on this dialog box can be linked by the Web sever. At most 32 URLs can be specified for one Web server. • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs.
Referer check	Select the check box to enable referer checking. System checks the headers of the HTTP packets and obtains the source site of the HTTP request. If the source site is in the Header Exception list, system will release it; otherwise, log or reset the connection. Thus controlling the Web site from other sites and to prevent chain of CSRF (Cross Site Request Forgery cross-site request spoofing) attacks occur. • External link exception: Click the 'External link exception ' to open the <External link exception>dialog box, where the configured URL can refer to the other Web site. Each Web server can be configured with up to 32 URLs. • Action: Specify the action for the HTTP request for the chaining behavior, either "Log only" or "Reset". “
Iframe check	Select the checkbox to enable iframe checking. System will identify if there are hidden iframe HTML pages by this function, then log it or reset its link.

Option	Description
	After iframe checking is enabled, system checks the iframe in the HTML page based on the specified iframe height and width, and when any height and width is less than or equal to the qualified value, system will identify as a hidden iframe attack, record, or reset connection that occurred. • Height: Specifies the height value for the iframe, range from 0 to 4096. • Width: Specifies the width value of the iframe, range from 0 to 4096. • Action: Specify the action for the HTTP request that hides iframe behavior, which is 'Only logged' or 'Reset'. Log Only - Record a log. Reset - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs.
ACL	Select the Enable check box to enable access control for the Web server. The access control function checks the upload paths of the websites to prevent the malicious code uploading from attackers. • ACL: Click this link, the ACL Configuration dialog appears. Specify websites and the properties on this dialog. "Static" means the URI can be accessed statically only as the static resource (images and text), otherwise, the access will handle as the action specified (log only/reset); "Block" means the resource of the website is not allowed to access. • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generate logs.
HTTP Request Flood Protection	Select the Enable check box to enable the HTTP request flood protection. • Request threshold: Specifies the request threshold. ◦ For the protected domain name, when the number of HTTP connecting request per second reaches the threshold and this lasts 20 seconds, system will treat it as a HTTP request flood attack, and will enable the HTTP request flood protection. ◦ For the protected full URL, when the number of HTTP connecting request per second towards this URL reaches the threshold and this lasts 20 seconds, system will treat it as a HTTP request flood attack towards this URL, and will enable the HTTP request flood protection. • Full URL: Enter the full URLs to protect particular URLs. Click this link to configure the URLs, for example, www.example.com/index.html. When protecting a particular URL, you can select a statistic object. When the number of HTTP connecting request per second by the object reaches the threshold and this lasts 20 seconds, system will treat it as a HTTP request flood attack by this object, and will enable the HTTP request flood protection.

Option	Description

	• x-forwarded-for: Select None, system will not use the value in x-forwarded-for as the statistic object. Select First, system will use the first value of the x-forwarded-for field as the statistic object. Select Last, system will use the last value of the x-forwarded-for field as the statistic object. Select All, system will use all values in x-forwarded-for as the statistic object.
	• x-real-ip: Select whether to use the value in the x-real-ip field as the statistic field.
	When the HTTP request flood attack is discovered, you can make the system take the following actions:
	• Authentication: Specifies the authentication method. System judges the legality of the HTTP request on the source IP through the authentication. If a source IP fails on the authentication, the current request from the source IP will be blocked. The available authentication methods are:
	  • Auto (JS Cookie): The Web browser will finish the authentication process automatically.
	  • Auto (Redirect): The Web browser will finish the authentication process automatically.
	  • Manual (Access Configuration): The initiator of the HTTP request must confirm by clicking OK on the returned page to finish the authentication process.
	  • Manual (CAPTCHA): The initiator of the HTTP request must be confirmed by entering the authentication code on the returned page to finish the authentication process.
	• Crawler-friendly: If this check box is selected, system will not authenticate to the crawler.
	• Request limit: Specifies the request limit for the HTTP request flood protection. After configuring the request limit, system will limit the request rate of each source IP. If the request rate is higher than the limitation specified here and the HTTP request flood protection is enabled, system will handle the exceeded requests according to the action specified (Block IP/Reset). To record a log, select the Record log check box.
	• Proxy limit: Specifies the proxy limit for the HTTP request flood protection. After configuring the proxy limit, system will check whether each source belongs to the each source IP proxy server. If belongs to, according to configuration to limit the request rate. If the request rate is higher than the limitation specified here and the HTTP request flood protection is enabled, system will handle the exceeded requests according to the action specified (Block IP/Reset). To record a log, select the Record log check box.
	• White List: Specifies the white list for the HTTP request flood protection. The source IP added to the white list will not check the HTTP request flood protection.

In the DNS tab, configure the following settings:

Option	Description
DNS	**Max Scan Length**: Specify the maximum length of scanning when scanning the DNS packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the DNS packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or send the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration.

In the FTP tab, configure the following settings:

Option	Description
FTP	**Max Scan Length**: Specify the maximum length of scanning when scanning the FTP packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the FTP packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Banner Detection**: Select the Enable check box to enable protection against FTP server banners. • Banner Information: Type the new information into the box that will replace the original server banner information. **Max Command Line Length**: Specifies a max length (including carriage return) for the FTP command line. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Response Line Length**: Specifies a max length for the FTP response line.If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Action for Brute-force**: If the login attempts per minute fail for the times specified by the threshold, system will identify the attempts as an intrusion and take an action according to the configuration. Select the Enable check box to enable brute-force. • Login Threshold per Min - Specifies a permitted authentication/login failure count per minute. • Block IP - Block the IP address of the attacker and specify a block

Option	Description
	duration. • Block Service - Block the service of the attacker and specify a block duration. • Block Time - Specifies the block duration.

In the MSRPC tab, configure the following settings:

Option	Description
MSRPC	**Max Scan Length**: Specify the maximum length of scanning when scanning the MSRPC packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the MSRPC packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max bind length**: Specifies a max length for MSRPC's binding packets. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max request length**: Specifies a max length for MSRPC's request packets. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Action for Brute-force**: If the login attempts per minute fail for the times specified by the threshold, system will identify the attempts as an intrusion and take an action according to the configuration. Select the Enable check box to enable brute-force. • Login Threshold per Min - Specifies a permitted authentication/login failure count per minute. • Block IP - Block the IP address of the attacker and specify a block duration. • Block Service - Block the service of the attacker and specify a block duration. • Block Time - Specifies the block duration.

In the POP3 tab, configure the following settings:

Option	Description
POP3	**Max Scan Length**: Specify the maximum length of scanning when scan-

Option	Description
	ning the POP3 packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the POP3 packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Banner Detection**: Select the **Enable** check box to enable protection against POP3 server banners. • Banner information - Type the new information into the box that will replace the original server banner information. **Max Command Line Length**: Specifies a max length (including carriage return) for the POP3 command line. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Parameter Length**: Specifies a max length for the POP3 client command parameter. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generates logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max failure time**: Specifies a max failure time (within one single POP3 session) for the POP3 server. If the failure time exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Action for Brute-force**: If the login attempts per minute fail for the times specified by the threshold, system will identify the attempts as an intrusion and take an action according to the configuration. Select the Enable check box to enable brute-force. • Login Threshold per Min - Specifies a permitted authentication/login failure count per minute. • Block IP - Block the IP address of the attacker and specify a block duration. • Block Service - Block the service of the attacker and specify a block duration. • Block Time - Specifies the block duration.

In the SMTP tab, configure the following settings:

Option	Description
SMTP	**Max Scan Length**: Specify the maximum length of scanning when scanning the SMTP packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the SMTP packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Banner Detection**: Select the **Enable** check box to enable protection against SMTP server banners. • Banner information - Type the new information into the box that will replace the original server banner information. **Max Command Line Length**: Specifies a max length (including carriage return) for the SMTP command line. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Path Length**: Specifies a max length for the reverse-path and forward-path field in the SMTP client command. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Reply Line Length**: Specifies a max length reply length for the SMTP server. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Text Line Length**: Specifies a max length for the E-mail text of the SMTP client. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Content Type Length**: Specifies a max length for the content-type of the SMTP protocol. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also gen-

Option	Description
	erate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Content Filename Length**: Specifies a max length for the filename of E-mail attachment. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Max Failure Time**: Specifies a max failure time (within one single SMTP session) for the SMTP server. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Action for Brute-force**: If the login attempts per minute fail for the times specified by the threshold, system will identify the attempts as an intrusion and take an action according to the configuration. Select the Enable check box to enable brute-force. • Login Threshold per Min - Specifies a permitted authentication/login failure count per minute. • Block IP - Block the IP address of the attacker and specify a block duration. • Block Service - Block the service of the attacker and specify a block duration. • Block Time - Specifies the block duration.

In the SUNRPC tab, configure the following settings:

Option	Description
SUNRPC	**Max Scan Length**: Specify the maximum length of scanning when scanning the SUNRPC packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the SUNRPC packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Action for Brute-force**: If the login attempts per minute fail for the times specified by the threshold, system will identify the attempts as an intrusion and take an action according to the configuration. Select the Enable check box to enable brute-force. • Login Threshold per Min - Specifies a permitted authentication/login failure count per minute.

Option	Description
	• Block IP - Block the IP address of the attacker and specify a block duration. • Block Service - Block the service of the attacker and specify a block duration. • Block Time - Specifies the block duration.

In the Telnet tab, configure the following settings:

Option	Description
Telnet	**Max Scan Length**: Specify the maximum length of scanning when scanning the Telnet packets. **Protocol Anomaly Detection**: Select **Enable** to analyze the Telnet packets. If abnormal contents exist, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends the destination unreachable packets (UDP) and also generate logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Username/Password Max Length**: Specifies a max length for the username and password used in Telnet. If the length exceeds the limits, you can: • Action: Log Only - Record a log. Rest - Reset connections (TCP) or sends destination unreachable packets (UDP) and also generates logs. Block IP - Block the IP address of the attacker and specify a block duration. Block Service - Block the service of the attacker and specify a block duration. **Action for Brute-force**: If the login attempts per minute fail for the times specified by the threshold, system will identify the attempts as an intrusion and take an action according to the configuration. Select the Enable check box to enable brute-force. • Login Threshold per Min - Specifies a permitted authentication/login failure count per minute. • Block IP - Block the IP address of the attacker and specify a block duration. • Block Service - Block the service of the attacker and specify a block duration. • Block Time - Specifies the block duration.

7. Click **Save** to complete the protocol configurations.
8. Click **OK** to complete the IPS rule configurations.

IPS Global Configuration

Configuring the IPS global settings includes:

- Enable the IPS function
- Specify how to merge logs
- Specify the work mode

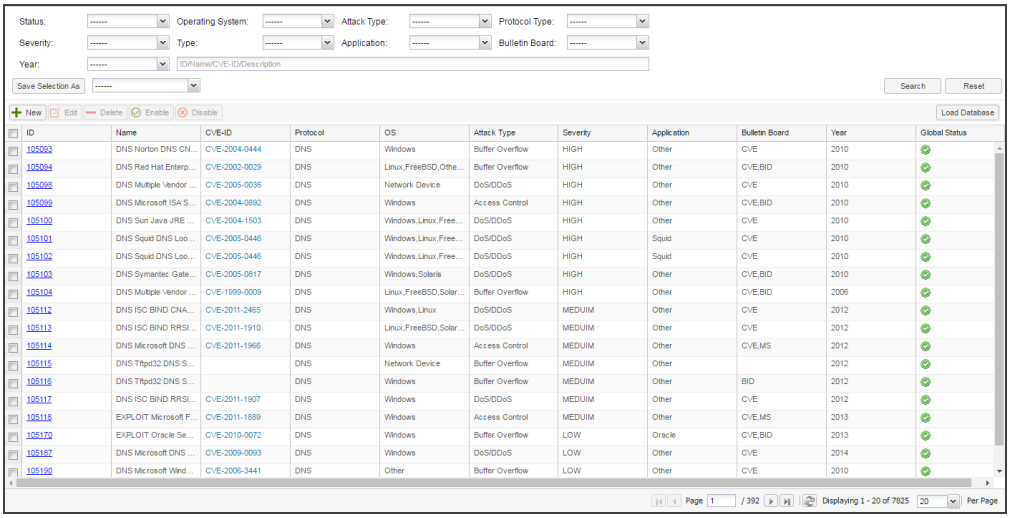
Click **Object > Intrusion Prevention System > Configuration** to configure the IPS global settings.

Option	Description
IPS	Select/clear the **Enable** check box to enable/disable the IPS function.
Merge Log	System can merge IPS logs which have the same protocol ID, the same VSYS ID, the same Signature ID, the same log ID, and the same merging type. Thus it can help reduce the number of logs and avoid receiving redundant logs. The function is disabled by default. Select the merging types in the drop-down list: • ---- - Do not merge any logs. • Source IP - Merge the logs with the same Source IP. • Destination IP - Merge the logs with the same Destination IP. • Source IP, Destination IP - Merge the logs with the same Source IP and the same Destination IP.
Aggregate Time	Specifies the time granularity for IPS threat log of the same merging type (specified above) to be stored in the database. At the same time granularity, the same type of log is only stored once. It ranges from 10 to 600 seconds.
Mode	Specifies a working mode for IPS: • IPS - If attacks have been detected, StoneOS will generate logs, and will also reset connections or block attackers. This is the default mode. • Log only - If attacks have been detected, StoneOS will only generate logs, but will not reset connections or block attackers.

After the configurations, click **OK** to save the settings.

Signature List

Select **Object > Intrusion Prevention System > Signature List**. You can see the signature list.



The upper section is for searching signatures. The lower section is for managing signatures.

Searching Signatures

In the upper section, set the search conditions and then click **Search** to search the signatures that match the condition.

To clear all search conditions, click **Reset**. To save the search conditions, click **Save Selection As** to name this set of search conditions and save it.

Managing Signatures

You can view signatures, create a new signature, load the database, delete a signature, edit a signature, enable a signature, and disable a signature.

- View signatures: In the signature list, click the ID of a signature to view the details.
- Create a new signature: click **New**.

In the General tab, configure the following settings:

Option	Description
Name	Specifies the signature name.
Description	Specifies the signature descriptions.
Protocol	Specifies the affected protocol.
Flow	Specifies the direction. • To_Server means the package of attack is from the server to the client. • To_Client means the package of attack is from the client to the server. • Any includes To_Server and To_Client.
Source Port	Specifies the source port of the signature. • Any - Any source port. • Included - The source port you specified should be included. It can be one port, several ports, or a range. Specifies the port number in the text box, and use "," to separate. • Excluded - The source port you specified should be excluded. It can be one port, several ports, or a range. Specifies the port number in the text box, and use "," to separate.
Destination Port	Specifies the destination port of the signature. • Any - Any destination port. • Included - The destination port you specified should be included. It can be one port, several ports, or a range. Specifies the port number in the text box, and use "," to separate. • Excluded - The destination port you specified should be excluded. It can be one port, several ports, or a range. Specifies the port number in the text box, and use "," to separate.
Dsize	Specifies the payload message size. Select "----",">", "<" or "=" from the drop-down list and specifies the value in the text box. "----" means no setting of the parameters.
Severity	Specifies the severity of the attack.
Attack Type	Select the attack type from the drop-down list.
Application	Select the affected applications. "----" means all applications.
Operating System	Select the affected operating system from the drop-down list. "----" means all the operating systems.
Bulletin Board	Select a bulletin board of the attack.
Year	Specifies the released year of attack.
Detection Filter	Specifies the frequency of the signature rule.

Option	Description
	• Track - Select the track type from the drop-down list. It can be **by_src** or **by_dst**. System will use the statistic of the source IP or the destination IP to check whether the attack matches this rule. • Count - Specifies the maximum times the rule occurs in the specified time. If the attacks exceed the Count value, system will trigger rules and act as specified. • Seconds - Specifies the interval value of the rule occurs.

In the Content tab, click New to specify the content of the signature:

Option	Description
Content	Specifies the signature content. Select the following check box if needed: • HEX - Means the content is hexadecimal. • Case Insensitive - Means the content is not case sensitive. • URI - Means the content needs to match URI field of HTTP request.

Relative	Specifies the signature content location.
	• If **Beginning** is selected, system will search from the header of the application layer packet.
	  • Offset: System will start searching after the offset from the header of the application layer packet. The unit is byte.
	  • Depth: Specifies the scanning length after the offset. The unit is byte.
	• If **Last Content** is selected, system will search from the content end position.
	  • Distance: System will start searching after the distance from the former content end position. The unit is byte.
	  • Within: Specifies the scanning length after the distance. The unit is byte.

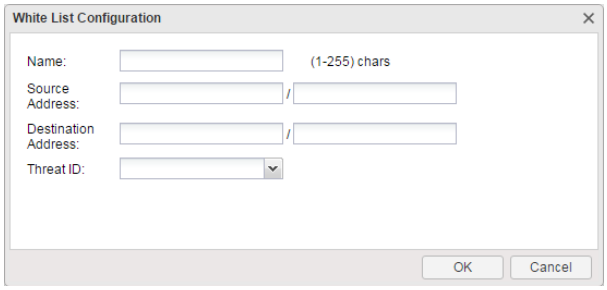
- Load the database: After you create a new signature, click **Load Database** to make the newly created signature take effect.
- Edit a signature: Select a signature and then click **Edit**. You can only edit the user-defined signature. After editing the signature, click **Load Database** to make the modifications take effect.
- Delete a signature: Select a signature and then click **Delete**. You can only delete the user-defined signature. After deleting the signature, click **Load Database** to make the deletion take effect.
- Enable/Disable signatures: After selecting signatures, click **Enable** or **Disable**.

Configuring IPS White list

The device detects the traffic in the network in real time. When a threat is detected, the device generates alarms or blocks threats. With the complexity of the network environment, the threat of the device will generate more and more warning, too much threat to the user can not start making the alarm, and many of them are false positives. By providing IPS whitelist, the system no longer reports alarms or blocks to the whitelist, thus reducing the false alarm rate of threats. The IPS whitelist consists of source address, destination address, and threat ID, and the user selects at least one item for configuration.

To configure an IPS white list :

1. Select **Policy > Intrusion Prevention System >White list**
2. Click **New**.



In the White List Configuration dialog , enter the White List configurations.

Option	Description
Name	Specifies the white-list name.
Source Address	Specifies the source address of the traffic to be matched by IPS.
Destination Adress	Specifies the destination address of the traffic to be matched by IPS.
Threat ID	Select the signature ID from the drop-down list. A whitelist can be configured with a maximum of one threat ID. When the threat ID is not setted,the traffic can be filtered based on the source and destination IP address. When user have configured threat ID, the source address, destination address and threat ID must be all matched successfully before the packets can be released.

3. Click **OK**.

Sandbox

A sandbox executes a suspicious file in a virtual environment, collects the actions of this file, analyzes the collected data, and verifies the legality of the file.

The Sandbox function of the system uses the cloud sandbox technology. The suspicious file will be uploaded to the cloud side. The cloud sandbox will collect the actions of this file, analyze the collected data, verify the legality of the file, give the analysis result to the system and deal with the malicious file with the actions set by system.

The Sandbox function contains the following parts:

- Collect and upload the suspicious file: The Sandbox function parses the traffic, and extracts the suspicious file from the traffic.
    - If there are no analyze result about this file in the local database, system will upload this file to the cloud intelligence server, and the cloud server intelligence will upload the suspicious file to the cloud sandbox for analysis.
    - If this file has been identified as an illegal file in the local database of the Sandbox function, system will generate corresponding threat logs and cloudsandbox logs.

  Additionally, you can specify the criteria of the suspicious files by configuring a sandbox profile.
- Check the analysis result returned from the cloud sandbox and take actions: The Sandbox function checks the analysis results of the suspicious file returned from the cloud sandbox, verifies the legality of the file, saves the result to the local database. If this suspicious file is identified as an illegal file, you need to deal with the file according to the actions (reset the connection or report logs) set by system. If it's the first time to find malicious file in local sandbox, system will record threat logs and cloud sandbox logs and cannot stop the malicious link. When malicious file accesses the cached threat information in the local machine, the threat will be effective only by resetting connection.

- Maintain the local database of the Sandbox function: Record the information of the uploaded files, including uploaded time and analysis result. This part is completed by the Sandbox function automatically.

Note: The Sandbox function is controlled by license. To use the Sandbox function, install the Cloud sandbox license.

Related Topics: Configuring Sandbox

Configuring Sandbox

This chapter includes the following sections:

- Preparation for configuring the Sandbox function
- Configuring the Sandbox rules
- Sandbox global configurations

Preparation

Before enabling the Sandbox function, make the following preparations:

1. Make sure your system version supports the Sandbox function.
2. The current device is registered to the Cloud View platform.
3. Import the Cloud sandbox license and reboot. The Sandbox function will be enabled after rebooting.

Note: Except M8860/M8260/M7860/M7360/M7260, if the Sandbox function is enabled, the max amount of concurrent sessions will decrease by half.

Configuring Sandbox

System supports the policy-based Sandbox. To create the policy-based Sandbox, take the following steps:

1. Click **Object > Sandbox > Configuration**. Select **Enable** check box to enable the Sandbox function.
2. Click **Object > Sandbox > Profile** to create a sandbox rule you need.
3. Bind the sandbox rule to a policy. Click **Policy > Security Policy**.Select the policy rule you want to bind or click **New** to create a new policy. In the Policy Configuration dialog box, select the **Protection** tab and then check the **Enable** check box of Sandbox.

Configuring a Sandbox Rule

A sandbox rule contains the files types that device has detected, the protocols types that the device has detected, the white list settings, and the file filter settings.

- File Type: Support to detect PE, APK, JAR, MS-Office, PDF, SWF, RAR and ZIP file.
- Protocol Type: Support to detect HTTP, FTP, POP3, SMTP and IMAP4 protocol.
- White list: A white list includes domain names that are safe. When a file extracted from the traffic is from a domain name in the white list, this file will not be marked as a suspicious file and it will not be upload to the cloud sandbox.

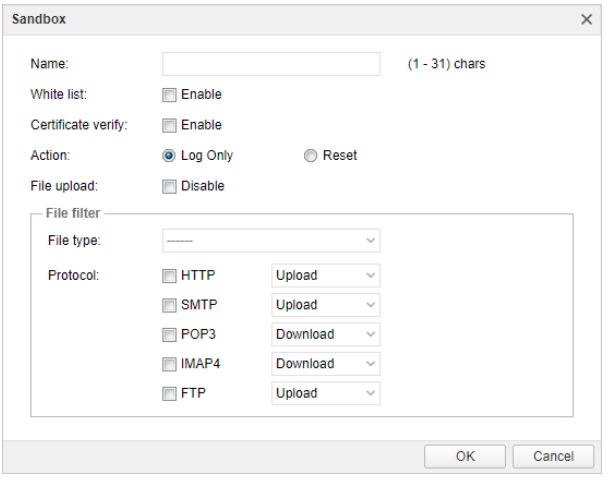
- File filter: Mark the file as a suspicious file if it satisfies the criteria configured in the file filter settings. The analysis result from the cloud sandbox determines whether this suspicious file is legal or not.
- Actions: When the suspicious file accesses the threat items in the local sandbox, system will deal with the malicious file with the set actions.

There are three built-in sandbox rules with the files and protocols type configured, white list enabled and file filter configured. The three default sandbox rules includes predef_low, predef_middle and predef_high.

- **predef_low**: A loose sandbox detection rule, whose file type is PE and protocol types are HTTP/FTP/POP3/SMTP/IMAP4, with white list and file filter enabled.
- **predef_middle**: A middle-level sandbox detection rule, whose file types are PE/APK/JAR/MS-Office/PDF and protocol types are HTTP/FTP/POP3/SMTP/IMAP4, with white list and file filter enabled.
- **predef_high**: A strict sandbox detection rule, whose file types are PE/APK/JAR/MS-Office/PDF/SWF/RAR/ZIP and protocol types are HTTP/FTP/POP3/SMTP/IMAP4, with white list and file filter enabled.

To create a new sandbox rule, take the following steps:

1. Select **Object > Sandbox**.
2. Click **New** to create a new sandbox rule. To edit an existing one, select the check box of this rule and then click **Edit**.



In the Sandbox Configuration dialog box, configure the following settings.

Option	Description
Name	Enter the name of the sandbox rule.
White List	Select **Enable** to enable the white list function. A white list includes domain names that are safe. When a file extracted from the traffic is from a domain name in the white list, this file will not be marked as a suspicious file and it will not be upload to the cloud sandbox. You can update the white list in **System > Upgrade Management > Signature Database Update > Sandbox Whitelist Database Update**.
Certificate verify	Select **Enable** to enable the verification for the trusted certification. After enabling, system will not detect the PE file whose certification is trusted.
Actions	When the suspicious file accesses the threat items in the local sandbox, system will deal with the malicious file with the set actions. Actions: • Record logs only - When detecting malicious files, system will pass traffic and record logs only (threat log and cloud sandbox log). • Reset - When detecting malicious files, system will reset connection of malicious link and record threat logs and cloud sandbox logs only.
File upload	By default, the file will be uploaded to the cloud sandbox when it marks it is classified as suspicious. Since some suspicious files contain user's sensitive information, you can disable the function of suspicious file uploading, which will prevent the suspicious file from being uploaded to the cloud sandbox. Select the **Disable** to disable the function of suspicious file uploading.
File Filter: Mark the file as a suspicious file if it satisfies the criteria configured in the file filter settings. The analysis result from the cloud sandbox determines whether this suspicious file is legal or not. The logical relation is AND.	
File Type	Mark the file of the specified file type as a suspicious file. The system can mark the PE(.exe), APK, JAR, MS-Office, PDF, SWF, RAR and ZIP file as a suspicious file now. If no file type is specified, the Sandbox function will mark no file as a suspicious one.
Protocol	Specifies the protocol to scan. System can scan the HTTP, FTP, POP3, SMTP and IMAP4 traffic now. If no protocol is specified, the Sandbox function will not scan the network traffic. After specifying the protocol type, you have to specify the direction of the detection: • **Upload** - The direction is from client to server. • **Download** - The direction is from server to client. • **Bothway** - The direction includes uploading and downloading directions.
File Size	Mark the file that is smaller than the specified file size as a suspicious file. By default, system will mark the files that are smaller than 6M as suspicious files.

3. Click **OK** to save the settings.

Threat List

The threat list means the list of threat items in the local sandbox. There are two sources of the threat items:

- The local sandbox finds suspicious files and reports to cloud. After verifying the file is malicious, the cloud will send the synchronous threat information to other devices, which has connected to the cloud and enabled Sandbox function. After the device receiving the synchronous threat information and matching the threat, the threat item will be listed in the threat list and system will block it with the set actions.
- The local sandbox finds suspicious file and reports to cloud. The cloud then analyzes and returns the result to the device. If the result is malicious, the threat item will be listed in the threat list.

You can filter and check threat items through specifying MD5 or the name of virus on the threat list page, as well as add the selected threat item to trust list. Take the following steps:

1. Click **Object > Sandbox > Threat List**.
2. Select the threat item that needs to be added to the trust list and click **Add to Trust List** button. When threat item is added, once it's matched, the corresponding traffic will be released.

Trust List

You can view all the sandbox threat information which can be detected on the device and add them to the trust list. Once the item in trust list is matched, the corresponding traffic will be released and not controlled by the actions of sandbox rule.

To remove threat items in the trust list, take the following steps:

1. Click **Object > Sandbox > Trust List**.
2. Select the threat item that needs to be removed in the trust list and click **Remove from Trust List** button. The threat item will be removed from the trust list.

Sandbox Global Configurations

To configure the sandbox global configurations, take the following steps:

1. Select **Object > Sandbox > Configuration**.
2. Select **Enable** check box of Sandbox to enable the Sandbox function. Clear the Enable check box to disable the Sandbox function.
3. Specify the file size for the files you need. The file that is smaller than the specified file size will be marked as a suspicious file.
4. If you select **Benign file** check box, system will record cloudsandbox logs of the file when it marks it as a benign file. By default, system will not record logs for the benign files.
5. If you select **Greyware** file check box, system will record cloudsandbox logs of the file when it marks it as a greyware file. A greyware file is the one system cannot judge it is a benign file or a malicious file. By default, system will not record logs for the greyware files.
6. Click **OK** to save the settings.

Attack-Defense

There are various inevitable attacks in networks, such as compromise or sabotage of servers, sensitive data theft, service intervention, or even direct network device sabotage that causes service anomaly or interruption. Security gates, belonging to a category of network security devices, must be designed with attack defense functions to detect various types of network attacks, and take appropriate actions to protect the Intranet against malicious attacks, thus assuring the normal operation of the Intranet and systems.

Devices provide attack defense functions based on security zones, and can take appropriate actions against network attacks to assure the security of your network systems.

ICMP Flood and UDP Flood

An ICMP Flood/UDP Flood attack sends huge amounts of ICMP messages (such as ping)/UDP packets to a target within a short period and requests for a response. Due to the heavy load, the attacked target cannot complete its normal transmission task.

ARP Spoofing

LAN transmits network traffic based on MAC addresses. ARP spoofing attacks occur by filling in the wrong MAC address and IP address to make a wrong corresponding relationship of the target host's ARP cache table. This will lead to the wrong destination host IP packets, and the packet network's target resources will be stolen.

SYN Flood

Due to resource limitations, a server will only permit a certain number of TCP connections. SYN Flood just makes use of this weakness. During the attack an attacker will craft a SYN packet, set its source address to a forged or non-existing address, and initiate a connection to a server. Typically the server should reply the SYN packet with SYN-ACK, while for such a carefully crafted SYN packet, the client will not send any ACK for the SYN-ACK packet, leading to a half-open connection. The attacker can send large amount of such packets to the attacked host and establish are equally large number of half-open connections until timeout. As a result, resources will be exhausted and normal accesses will be blocked. In the environment of unlimited connections, SYN Flood will exhaust all the available memory and other resources of the system.

WinNuke Attack

A WinNuke attack sends OOB (out-of-band) packets to the NetBIOS port (139) of a Windows system, leading to NetBIOS fragment overlap and host crash. Another attacking vector is IGMP fragment. Generally an ICMP packet will not be fragmented; so many systems cannot properly process IGMP fragments. If your system receives any IGMP fragment, it's almost certain that the system is under attack.

IP Address Spoofing

IP address spoofing is a technology used to gain unauthorized access to computers. An attacker sends packets with a forged IP address to a computer, and the packets are disguised as if they were from a real host. For applications that implement validation based on IP addresses, such an attack allows unauthorized users to gain access to the attacked system. The attacked system might be compromised even if the response packets cannot reach the attacker.

IP Address Sweep and Port Scan

This kind of attack makes a reconnaissance of the destination address and port via scanners, and determines the existence from the response. By IP address sweeping or port scanning, an attacker can determine which systems are alive and connected to the target network, and which ports are used by the hosts to provide services.

Ping of Death Attack

Ping of Death is designed to attack systems by some over-sized ICMP packets. The field length of an IP packet is 16 bits, which means the max length of an IP packet is 65535 bytes. For an ICMP response packet, if the data length is larger than 65507 bytes, the total length of ICMP data, IP header (20 bytes) and ICMP header (8 bytes) will be larger than 65535 bytes. Some routers or systems cannot properly process such a packet, and might result in crash, system down or reboot.

Teardrop Attack

Teardrop attack is a denial of service attack. It is a attack method based on morbid fragmented UDP packets, which works by sending multiple fragmented IP packets to the attacker (IP fragmented packets include the fragmented packets of which packet, the packet location, and other information). Some operating systems contain overlapping offset that will crash, reboot, and so on when receiving fragmented packets.

Smurf Attack

Smurf attacks consist of two types: basic attack and advanced attack. A basic Smurf attack is used to attack a network by setting the destination address of ICMP ECHO packets to the broadcast address of the attacked network. In such a condition all the hosts within the network will send their own response to the ICMP request, leading to network congestion. An advanced Smurf attack is mainly used to attack a target host by setting the source address of ICMP ECHO packets to the address of the attacked host, eventually leading to host crash. Theoretically, the more hosts in a network, the better the attacking effect will be.

Fraggle Attack

A fraggle attack is basically the same with a smurf attack. The only difference is the attacking vector of fraggle is UDP packets.

Land Attack

During a Land attack, an attacker will carefully craft a packet and set its source and destination address to the address of the server that will be attacked. In such a condition the attacked server will send a message to its own address, and this address will also return a response and establish a Null connection. Each of such connections will be maintained until timeout. Many servers will crash under Land attacks.

IP Fragment Attack

An attacker sends the victim an IP datagram with an offset smaller than 5 but greater than 0, which causes the victim to malfunction or crash.

IP Option Attack

An attacker sends IP datagrams in which the IP options are abnormal. This attack intends to probe the network topology. The target system will break down if it is incapable of processing error packets.

Huge ICMP Packet Attack

An attacker sends large ICMP packets to crash the victim. Large ICMP packets can cause memory allocation error and crash the protocol stack.

TCP Flag Attack

An attacker sends packets with defective TCP flags to probe the operating system of the target host. Different operating systems process unconventional TCP flags differently. The target system will break down if it processes this type of packets incorrectly.

DNS Query Flood Attack

The DNS server processes and replies to all DNS queries that it receives. A DNS flood attacker sends a large number of forged DNS queries. This attack consumes the bandwidth and resources of the DNS server, which prevents the server from processing and replying legal DNS queries.

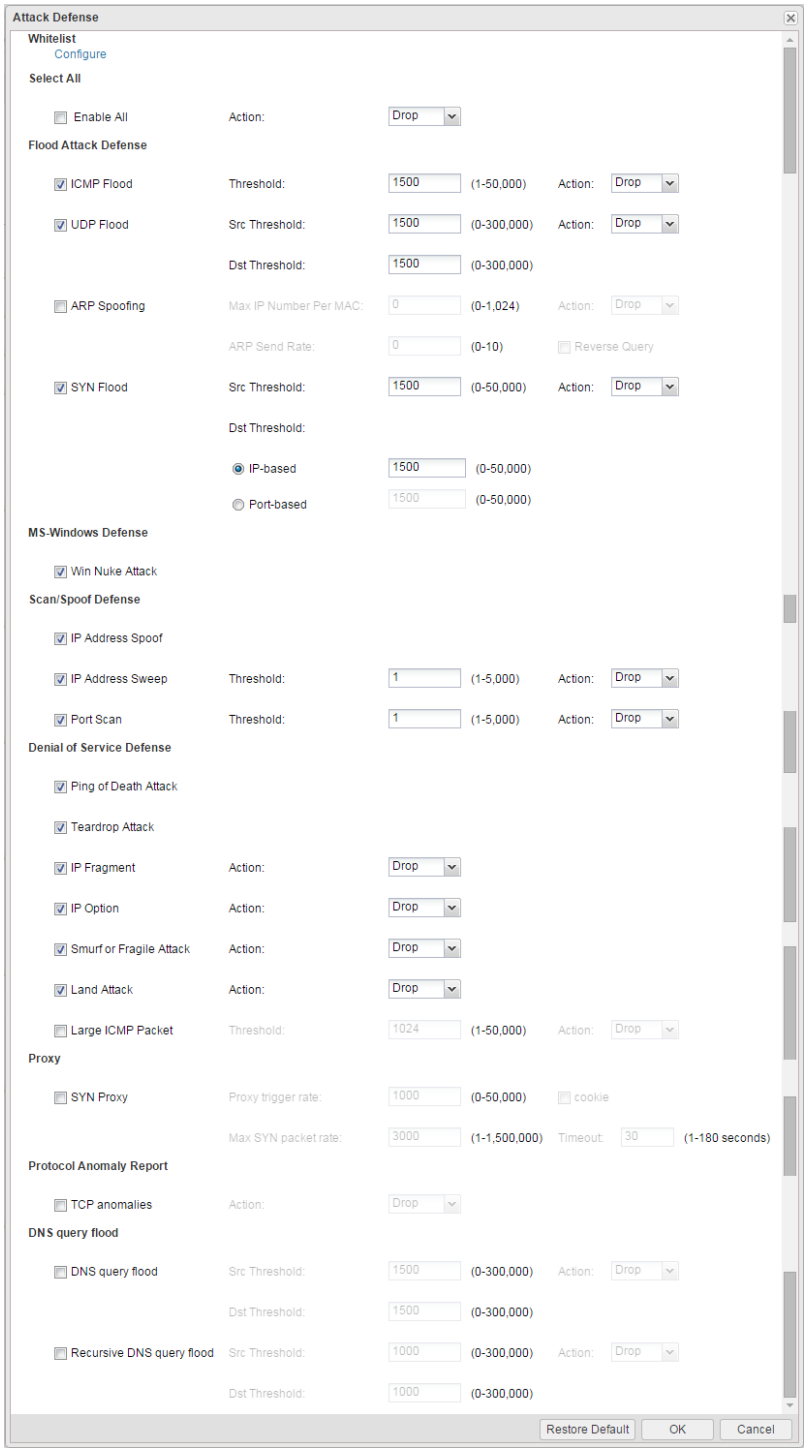
TCP Split Handshake Attack

When a client establishes TCP connection with a malicious TCP server, the TCP server will respond to a fake SYN packet and use this fake one to initialize the TCP connection with the client. After establishing the TCP connection, the malicious TCP server switches its role and becomes the client side of the TCP connection. Thus, the malicious traffic might enter into the intranet.

Configuring Attack Defense

To configure the Attack Defense based on security zones, take the following steps:

1. Create a zone. For more information, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog box, select Threat Protection tab.
3. To enable the Attack Defense functions, select the Enable all check box, and click **Configure**.



In the <Attack Defense> dialog box, enter the Attack Defense configurations.

Option	Description
Whitelist	IP address or IP range in the whitelist is exempt from attack defense check. click **Configure**.

Option	Description
	• IP/Netmask - Specifies the IP address and netmask and click Add to add to the whitelist. • Address entry - Specifies the address entry and click Add to add to the whitelist.
Select all	**Enable all**: Select this check box to enable all the Attack Defense functions for the security zone. **Action**: Specifies an action for all the Attack Defense functions, i.e., the defense measure system will be taken if any attack has been detected. • Drop - Drops packets. This is the default action. • Alarm - Gives an alarm but still permits packets to pass through. • --- - Do not specify global actions.
Flood Attack Defense	**ICMP flood**: Select this check box to enable ICMP flood defense for the security zone. • Threshold - Specifies a threshold for inbound ICMP packets. If the number of inbound ICMP packets matched to one single IP address per second exceeds the threshold, system will identify the traffic as an ICMP flood and take the specified action. The value range is 1 to 50000. The default value is 1500. • Action - Specifies an action for ICMP flood attacks. If the default action Drop is selected, system will only permit the specified number (threshold) of IMCP packets to pass through during the current and the next second, and also give an alarm. All the excessive packets of the same type will be dropped during this period.
	UDP flood: Select this check box to enable UDP flood defense for the security zone. • Src threshold - Specifies a threshold for outbound UDP packets. If the number of outbound UDP packets originating from one single source IP address per second exceeds the threshold, system will identify the traffic as a UDP flood and take the specified action. The value range is 1 to 50000. The default value is 1500. • Dst threshold - Specifies a threshold for inbound UDP packets. If the number of inbound UDP packets destined to one single port of one single destination IP address per second exceeds the threshold, system will identify the traffic as a UDP flood and take the specified action. The value range is 1 to 50000. The default value is 1500. • Action - Specifies an action for UDP flood attacks. If the default action Drop is selected, system will only permit the specified number (threshold) of UDP packets to pass through during the current and the next second, and also give an alarm. All the excessive packets of the same type will be dropped during this period. • Session State Check - Select this check box to enable the function of session state check. After the function is enabled, system will not check whether there is UDP Flood attack in the backward traffic of UDP packet of the identified sessions.
	ARP spoofing: Select this check box to enable ARP spoofing defense for the security zone.

Option	Description
	• Max IP number per MAC - Specifies whether system will check the IP number per MAC in the ARP table. If the parameter is set to 0, system will not check the IP number; if it is set to a value other than 0, system will check the IP number, and if the IP number per MAC is larger than the parameter value, system will take the specified action. The value range is 0 to 1024. • Gratuitous ARP send rate - Specifies if StoneOS will send gratuitous ARP packet(s). If the parameter is set to 0 (the default value), StoneOS will not send any gratuitous ARP packet; if it is set to a value other than 0, StoneOS will send gratuitous ARP packet(s), and the number sent per second is the specified parameter value. The value range is 0 to 10. • Reverse query - Select this check box to enable Reverse query. When StoneOS receives an ARP request, it will log the IP address and reply with another ARP request; and then StoneOS will check if any packet with a different MAC address will be returned, or if the MAC address of the returned packet is the same as that of the ARP request packet.

	SYN flood: Select this check box to enable SYN flood defense for the security zone.
	• Src threshold - Specifies a threshold for outbound SYN packets (ignoring the destination IP address and port number). If the number of outbound SYN packets originating from one single source IP address per second exceeds the threshold, StoneOS will identify the traffic as a SYN flood. The value range is 0 to 50000. The default value is 1500. The value of 0 indicates the Src threshold is void.
	• Dst threshold - Specifies a threshold for inbound SYN packets destined to one single destination IP address per second.
	  • IP-based - Click **IP-based** and then type a threshold value into the box behind. If the number of inbound SYN packets matched to one single destination IP address per second exceeds the threshold, StoneOS will identify the traffic as a SYN flood. The value range is 0 to 50000. The default value is 1500. The value of 0 indicates the Dst threshold is void.
	  • Port-based - Click **Port-based** and then type a threshold value into the box behind. If the number of inbound SYN packets matched to one single destination port of the destination IP address per second exceeds the threshold, StoneOS will identify the traffic as a SYN flood. The value range is 0 to 50000. The default value is 1500. The value of 0 indicates the Dst threshold is void. After clicking **Port-based**, you also need to type an address into or select an **IP Address** or **Address entry** from the **Dst address** combo box to enable port-based SYN flood defense for the specified segment. The SYN flood attack defense for other segments will be IP based. The value range for the mask of the Dst address is 24 to 32.
	• Action - Specifies an action for SYN flood attacks. If the default action Drop is selected, StoneOS will only permit the specified number (threshold) of SYN packets to pass through during the current and the next second, and also give an alarm. All the excessive packets of the same type will be dropped during this period. Besides if Src threshold and Dst threshold are also configured, StoneOS will

Option	Description
	first detect if the traffic is a destination SYN flood attack: if so, StoneOS will drop the packets and give an alarm, if not, StoneOS will continue to detect if the traffic is a source SYN attack.
MS-Windows defense	**WinNuke attack**: Select this check box to enable WinNuke attack defense for the security zone. If any WinNuke attack has been detected, StoneOS will drop the packets and give an alarm.
Scan/spoof defense	**IP address spoof**: Select this check box to enable IP address spoof defense for the security zone. If any IP address spoof attack has been detected, StoneOS will drop the packets and give an alarm.
	IP address sweep: Select this check box to enable IP address sweep defense for the security zone. • Threshold - Specifies a time threshold for IP address sweep. If over 10 ICMP packets from one single source IP address are sent to different hosts within the period specified by the threshold, StoneOS will identify them as an IP address sweep attack. The value range is 1 to 5000 milliseconds. The default value is 1. • Action - Specifies an action for IP address sweep attacks. If the default action Drop is selected, StoneOS will only permit 10 IMCP packets originating from one single source IP address while matched to different hosts to pass through during the specified period (threshold), and also give an alarm. All the excessive packets of the same type will be dropped during this period.
	Port scan: Select this check box to enable port scan defense for the security zone. • Threshold - Specifies a time threshold for port scan. If over 10 TCP SYN packets are sent to different ports of one single destination address within the period specified by the threshold, StoneOS will identify them as a port scan attack. The value range is 1 to 5000 milliseconds. The default value is 1. • Action - Specifies an action for port scan attacks. If the default action Drop is selected, StoneOS will only permit 10 TCP SYN packets destined to different ports of one single destination address to pass through, and also give an alarm. All the excessive packets of the same type will be dropped during this period.
Denial of service defense	**Ping of Death attack**: Select this check box to enable Ping of Death attack defense for the security zone. If any Ping of Death attack has been attacked, StoneOS will drop the attacking packets, and also give an alarm.
	Teardrop attack: Select this check box to enable Teardrop attack defense for the security zone. If any Teardrop attack has been attacked, StoneOS will drop the attacking packets, and also give an alarm.
	IP fragment: Select this check box to enable IP fragment defense for the security zone. • Action - Specifies an action for IP fragment attacks. The default action is Drop.
	IP option: Select this check box to enable IP option attack defense for the security zone. StoneOS will defend against the following types of IP options: Security, Loose Source Route, Record Route, Stream ID, Strict Source Route and Timestamp.

Option	Description
	• Action - Specifies an action for IP option attacks. The default action is Drop.
	Smurf or fraggle attack: Select this check box to enable Smurf or fraggle attack defense for the security zone. • Action - Specifies an action for Smurf or fraggle attacks. The default action is Drop.
	Land attack: Select this check box to enable Land attack defense for the security zone. • Action - Specifies an action for Land attacks. The default action is Drop.
	Large ICMP packet: Select this check box to enable large ICMP packet defense for the security zone. • Threshold - Specifies a size threshold for ICMP packets. If the size of any inbound ICMP packet is larger than the threshold, StoneOS will identify it as a large ICMP packet and take the specified action. The value range is 1 to 50000 bytes. The default value is 1024. • Action - Specifies an action for large ICMP packet attacks. The default action is Drop.
Proxy	**SYN proxy**: Select this check box to enable SYN proxy for the security zone. SYN proxy is designed to defend against SYN flood attacks in combination with SYN flood defense. When both SYN flood defense and SYN proxy are enabled, SYN proxy will act on the packets that have already passed detections for SYN flood attacks. • Proxy trigger rate - Specifies a min number for SYN packets that will trigger SYN proxy or SYN-Cookie (if the Cookie check box is selected). If the number of inbound SYN packets matched to one single port of one single destination IP address per second exceeds the specified value, StoneOS will trigger SYN proxy or SYN-Cookie. The value range is 1 to 50000. The default value is 1000. • Cookie - Select this check box to enable SYN-Cookie. SYN-Cookie is a stateless SYN proxy mechanism that enables StoneOS to enhance its capacity of processing multiple SYN packets. Therefore, you are advised to expand the range between "Proxy trigger rate" and "Max SYN packet rate" appropriately. • Max SYN packet rate - Specifies a max number for SYN packets that are permitted to pass through per second by SYN proxy or SYN-Cookie (if the Cookie check box is selected). If the number of inbound SYN packets destined to one single port of one single destination IP address per second exceeds the specified value, StoneOS will only permit the specified number of SYN packets to pass through during the current and the next second. All the excessive packets of the same type will be dropped during this period. The value range is 1 to 1500000. The default value is 3000. • Timeout - Specifies a timeout for half-open connections. The half-open connections will be dropped after timeout. The value range is 1 to 180 seconds. The default value is 30.
Protocol abnormally report	**TCP option anomaly**: Select this check box to enable TCP option anomaly defense for the security zone.

Option	Description
	• Action - Specifies an action for TCP option anomaly attacks. The default action is Drop. **TCP split handshake**: Select this check box to enable TCP split handshake defense for the security zone. • Action - Specifies an action for TCP split handshake attacks. The default action is Drop.
DNS query flood	**DNS query flood**: Select this check box to enable DNS query flood defense for the security zone. • Src threshold - Specifies a threshold for outbound DNS query packets. If the number of outbound DNS query packets originating from one single IP address per second exceeds the threshold, StoneOS will identify the traffic as a DNS query flood and take the specified action. • Dst threshold - Specifies a threshold for inbound DNS query packets. If the number of inbound DNS query packets matched to one single IP address per second exceeds the threshold, StoneOS will identify the traffic as a DNS query flood and take the specified action. • Action - Specifies an action for DNS query flood attacks. If the default action Drop is selected, StoneOS will only permit the specified number (threshold) of DNS query packets to pass through during the current and next second, and also give an alarm. All the excessive packets of the same type will be dropped during this period; if Alarm is selected, StoneOS will give an alarm but still permit the DNS query packets to pass through.
	Recursive DNS query flood: Select this check box to enable recursive DNS query flood defense for the security zone. • Src threshold - Specifies a threshold for outbound recursive DNS query packets packets. If the number of outbound DNS query packets originating from one single IP address per second exceeds the threshold, StoneOS will identify the traffic as a DNS query flood and take the specified action. • Dst threshold - Specifies a threshold for inbound recursive DNS query packets packets. If the number of inbound DNS query packets destined to one single IP address per second exceeds the threshold, StoneOS will identify the traffic as a DNS query flood and take the specified action. • Action - Specifies an action for recursive DNS query flood attacks. If the default action Drop is selected, StoneOS will only permit the specified number (threshold) of recursive DNS query packets to pass through during the current and next second, and also give an alarm. All the excessive packets of the same type will be dropped during this period; if Alarm is selected, StoneOS will give an alarm but still permit the recursive DNS query packets to pass through.

4. To restore the system default settings, click **Restore Default**.
5. Click **OK**.

Perimeter Traffic Filtering

Perimeter Traffic Filtering can filter the perimeter traffic based on known IP of black/white list, and take block action on the malicious traffic that hits the blacklist.

Black/White list includes the following three types:

- Predefined black list: Retrieve the IP of black/white list from the Perimeter Traffic Filtering signature database.
- User-defined black/white list : According to the actual needs of users, the specified IP address is added to a user-definedblack/white list.
- Third-party black list: Make a linkage with trend of TDA, to get blacklisted from the trend TDA devices regularly.

Note:

- You need to update the IP reputation database before enabling the function for the first time. By default, system will update the database at the certain time everyday, and you can modify the updating settings according to your own requirements, see "Upgrading System" on Page 475.
- Perimeter Traffic Filtering is controlled by license. To use Threat protection, apply and install the PTF license.

Enabling Perimeter Traffic Filtering

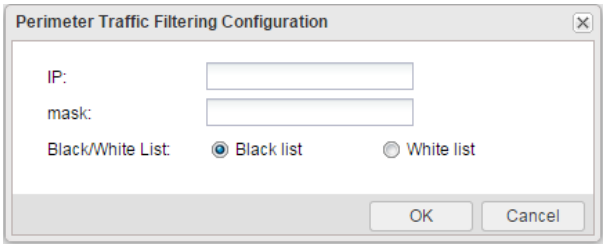
To realize the zone-based Perimeter Traffic Filtering, take the following steps:

1. Create a zone. For more information , refer to "Security Zone" on Page 9;
2. In the Zone Configuration dialog box, select Threat Protection tab.
3. Select the **Enable** check box after the **Perimeter Traffic Filtering**.
4. Specifies an action for the malicious traffic that hits the blacklist. Select the **User-defined** , **Pre-defined** or **TDA** check box , and select the action from drop-down list:
   - Log Only: Only generates logs if the malicious traffic hits the blacklist.This is the default option.
   - Drop: Drop packets if the malicious traffic hits the blacklist.

Configuring User-defined Black/White List

To configure the user-defined black/white list , take the following steps:

1. Select **Object > Perimeter Traffic Filtering**.
2. Click **New**.



In Perimeter Traffic Filtering Configuration dialog box, enter the user-defined black/white list

configuration.

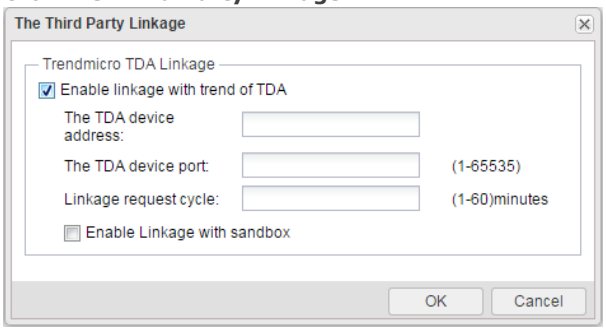
Option	Description
IP	Specify the IP address for the user-defined black/white list.
mask	Specify the netmask of the IP address.
Black/White List	Select the radio button to add the IP address to the blacklist or whitelist .

3. Click **OK**.

Configuring Third-party Black List

To configure the third-party linkage, take the following steps:

1. Select **Object > Perimeter Traffic Filtering**.
2. Click **The Third Party linkage**.



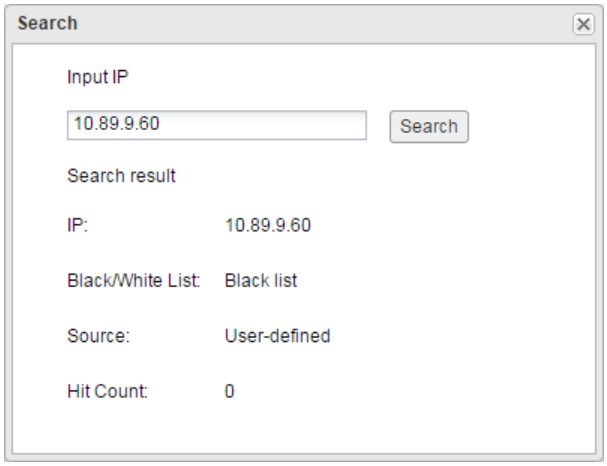
In The Third Party linkage dialog box, enter the linkage configuration.

Option	Description
Enable linkage with trend of TDA	Select the check box to enabling linkage with trend of TDA.
The TDA device address	Specify the address for the TDA device.
The TDA device port	Specify the port number for the TDA device. The value range is 1 to 65535.
Linkage request cycle	Specify the Linkage request period for getting the blacklisted from the TDA devices.
Enable Linkage with sandbox	Select the check box to get the blacklist of the TDA device sandbox.

Searching Black/White List

To search the black/white list, take the following steps:

1. Select **Object > Perimeter Traffic Filtering**.
2. Click **Search**.



3. Enter the IP address and click **Search**. The results will be displayed in this dialog box.

Botnet C&C Prevention

Botnet refers to a kind of network that uses one or more means of communication to infect a large number of hosts with bots, forming a one-to-many controlled network between the controller and the infected host, which will cause a great threat to network and data security.

The botnet C&C prevention function can detect botnet host in the internal network timely, as well as locate and take other actions according to the configuration, so as to avoid further threat attacks.

The botnet C&C prevention configurations are based on security zones or policies. If the botnet C&C prevention profile is bound to a security zone, the system will detect the traffic destined to the specified security zone based on the profile configuration. If the botnet C&C prevention profile is bound to a policy rule, the system will detect the traffic matched to the specified policy rule based on the profile configuration.

Note: The botnet C&C prevention function is controlled by license. To use the botnet C&C prevention function, install the Botnet C&C Prevention license.

Related Topics:

- "Configuring Botnet C&C Prevention" on Page 378
- "Address Liberary" on Page 380
- "Botnet C&C Prevention Global Configuration" on Page 381

Configuring Botnet C&C Prevention

This chapter includes the following sections:

- Preparation for configuring Botnet C&C Prevention function
- Configuring Botnet C&C Prevention function

Preparing

Before enabling botnet C&C prevention, make the following preparations:

1. Make sure your system version supports botnet C&C prevention.
2. Import a botnet C&C prevention license and reboot. The botnet C&C prevention will be enabled after the rebooting.

Note:

- You need to update the botnet C&C prevention signature database before enabling the function for the first time. To assure a proper connection to the default update server, you need to configure a DNS server for system before updating.

Configuring Botnet C&C Prevention Function

The Botnet C&C Prevention configurations are based on security zones or policies.

To realize the zone-based Botnet C&C Prevention, take the following steps:

1. Create a zone. For more information, refer to "Security Zone" on Page 9.
2. In the Zone Configuration dialog, select Threat Protection tab.
3. Enable the threat protection you need and select a Botnet C&C Prevention rule from the profile drop-down list below; or you can click **Add Profile** from the profile drop-down list. To create a Botnet C&C Prevention rule, see Configuring a Botnet C&C Prevention Rule.
4. Click **OK** to save the settings.

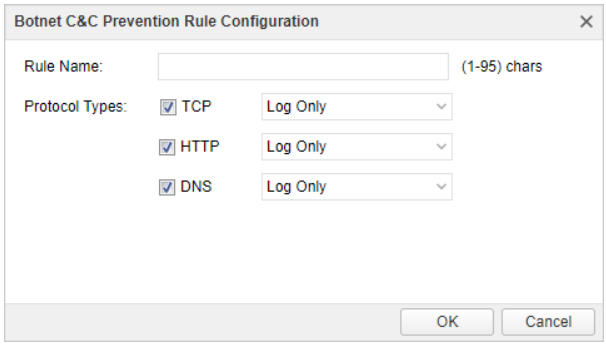
To realize the policy-based Botnet C&C Prevention, take the following steps:

1. Create a security policy rule. For more information, refer to "Security Policy" on Page 281.
2. In the Policy Configuration dialog box, select the Protection tab.
3. Select the **Enable** check box of **Botnet C&C Prevention**. Then select an Anti-Spam rule from the Profile drop-down list, or you can click **Add Profile** from the Profile drop-down list to create a Botnet C&C Prevention rule. For more information, see Configuring a Botnet C&C Prevention Rule.
4. Click **OK** to save the settings.

Configuring a Botnet C&C Prevention Rule

To configure a Botnet C&C Prevention rule, take the following steps:

1. Click **Object** > **Botnet C&C Prevention**> **Profile**.
2. Click **New**.



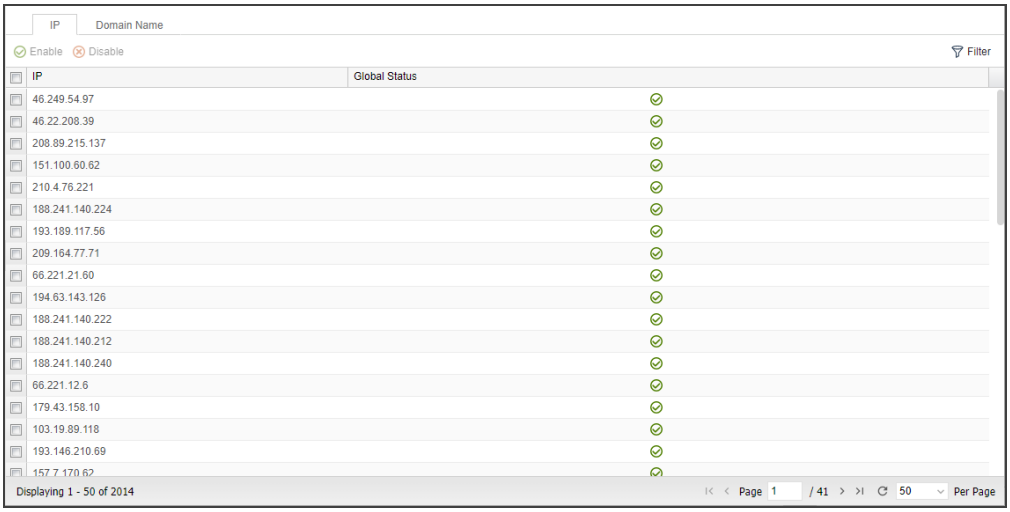
In the Botnet C&C Prevention Rule Configuration dialog box, enter the Botnet C&C Prevention rule configurations.

Option	Description
Rule Name	Specifies the rule name.
Protocol Types	Specifies the protocol types (TCP, HTTP, DNS) you want to scan and specifies the action the system will take after the botnet is found. • Log Only - Only generates log. • Reset Connection - If botnets has been detected, system will reset connections to the files.

3. Click **OK**.

Address Liberary

Select **Object > Botnet C&C Prevention > Address Liberary**. You can see the IP address and domain name list.



Enabling/Disabling the Address Entry

To disable the signature of the specified IP/domain name, take the following steps:

1. Click **IP** or **Domain Name** tab.
2. Select the IP or domain name entry that you want to enable/disable, and then click **Enable** or **Disable**.

Botnet C&C Prevention Global Configuration

To configure the Botnet C&C Prevention global settings, take the following steps:

1. Click **Object** > **Botnet C&C Prevention** > **Configuration**.

2. Select/clear the **Enable** check box to enable/disable the Botnet C&C Prevention function.
3. Click **OK** to save the settings.

Chapter 10 Monitor

The monitor section includes the following functions:

- **Monitor**: The Monitor function statistically analyzes the devices and displays the statistics in a bar chart, line chart, tables, and so on, which helps the users have information about the devices.
- **WAP traffic distribution**: Displays the history result (In the past 24 hours and the last 30 days) of WAP traffic distribution, including requests and responses.
- **Report**: Through gathering and analyzing the device traffic data, traffic management data, threat data, monitor data and device resource utilization data, the function provides the all-around and multi-demensional staticstcs.
- **Log**: Records various system logs, including system logs, threat logs, session logs, NAT logs, NBC logs and configuration logs.

Monitor

System can monitor the following objects.

- **User**: Displays the application statistics within the specified period (Realtime, latest 1 hour, latest 1 day, latest 1 month) The statistics include the application traffic and applications' concurrent sessions.
- **Application**: Displays the statistics of applications, application categories, application subcategories, application risk levels, application technologies, application characteristics within the specified period (Realtime, latest 1 hour, latest 1 day, latest 1 month). The statistics include the application traffic and applications' concurrent sessions.
- **Cloud Application**: Displays statistics of cloud based applications, including their traffic, new sessions and concurrent sessions.
- **Share Access Detect**: Displays the access terminal statistics of specified filter condition(Virtual router, IP, host number), including operation system , online time, login time and last online time of users.
- **End Point Detect**:Displays the endpoint data information list synchronized with the endpoint security control center.
- **Device**: Displays the device statistics within the specified period (Realtime, latest 1 hour, latest 1 day, latest 1 month), including the total traffic, interface traffic, zone traffic, CPU/memory status, sessions, Online IP and hardware status.
- **URL Hit**: If system is configured with "URL Filter" on Page 237, the predefined stat-set of URL Hit can gather statistics on user/IPs, URLs and URL categories.
- **Link State Monitor**:Displays the traffic statistics of the interfaces that have been bound within the specified period .
- **Application Block**: If system is configured with "Security Policy" on Page 281 the application block can gather statistics on the applications and user/IPs.
- **Keyword Block**: If system is configured with"Web Content" on Page 260, "Email Filter" on Page 266, "Web Posting" on Page 263, the predefined stat-set of Keyword Block can gather statistics on the Web keyword, Web keywords, email keywords, posting keywords and users/IPs.
- **Authentication User**: If system is configured with"Web Authentication" on Page 89, "Single Sign-On" on Page 96, "SSL VPN" on Page 137 , "L2TP VPN" on Page 196 the auth user can gather statistics on the authenticated users.
- **Monitor Configuration**: Enable or disable some monitor items as needed.
- **User-defined Monitor**: Provides a more flexible approach to view the statistics.

Note: If IPv6 is enabled, system will count the total traffic/sessions/AD/URLs/applications of IPv4 and IPv6 address. Only User Monitor/Application Monitor/Cloud Application Monitor/Device Monitor/URL Hit/Application Block/User-defined Monitor support IPv6 address.

User Monitor

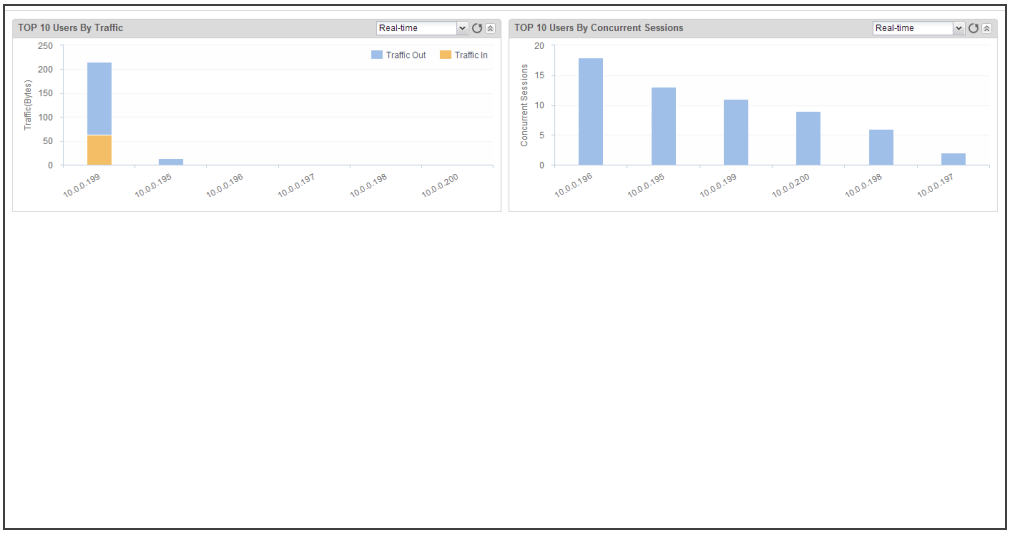
This feature may vary slightly on different platforms . If there is a conflict between this guide and the actual page, the latter shall prevail.

User monitor displays the application statistics within the specified period (Realtime, latest 1 hour, latest 1 day, latest 1 month) . The statistics include the application traffic and applications' concurrent sessions.

If IPv6 is enabled, system will support to monitor both IPv4 and IPv6 address.

Summary

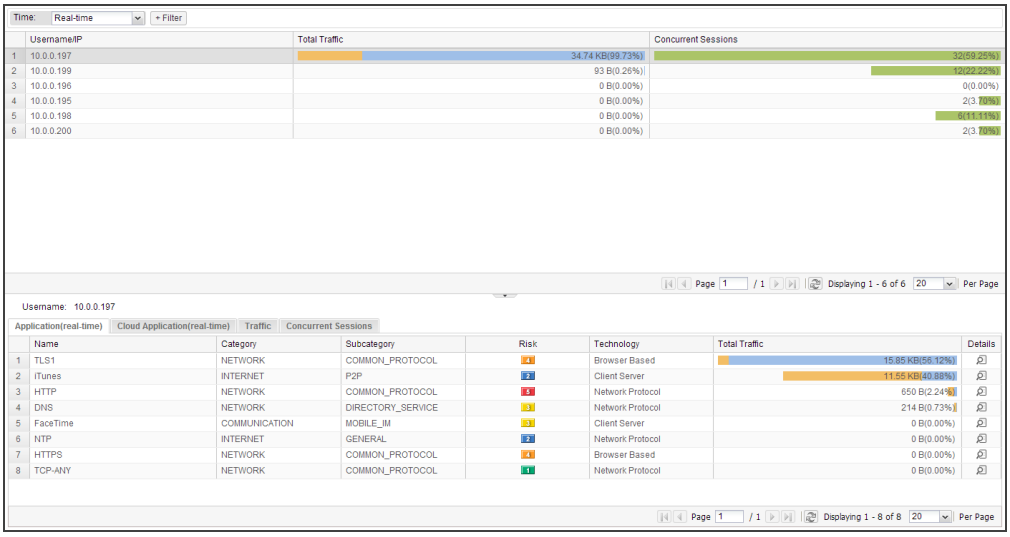
Summary displays the user traffic/concurrent sessions ranking during a specified period or of specified interfaces/zones. Click **Monitor > User > Summary**.



- Select a different Statistical_Period to view the statistical information in that period of time.
- Click to refresh the monitoring data in this page.
- Hover your mouse over a bar to view the user 's average upstream traffic, downstream traffic, total trafficor concurrent sessions .
- When displaying the user traffic statistics, the Upstream and Downstream legends are used to select the statistical objects in the bar chart.

User Details

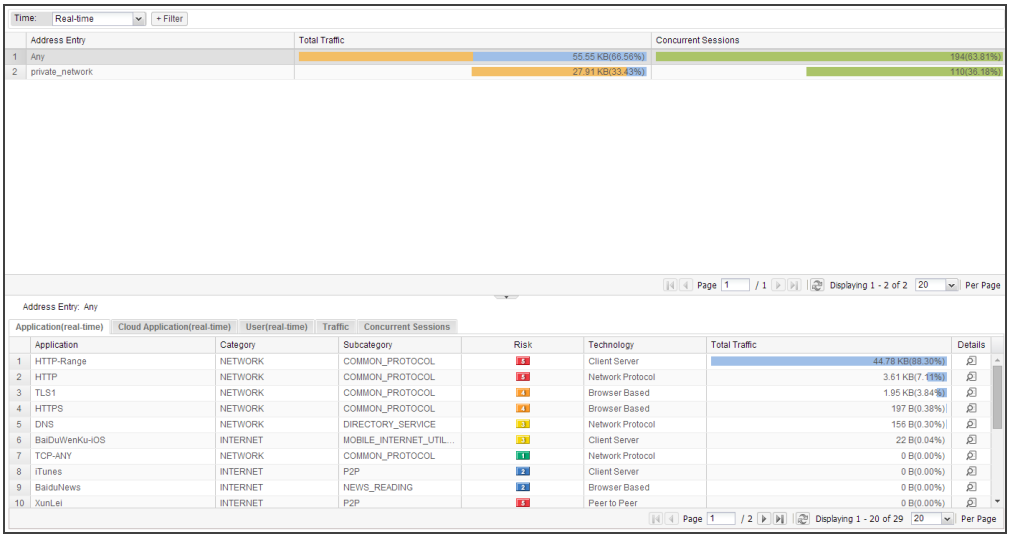
Click **Monitor > User > User Details**.



- Click + Filter to select the condition in the drop-down list to search the desired users.
- To view the detailed information of a certain user , select the user entry in the list.
  - Application(real-time): Select the Application (real-time)tab and display the detailed information of the upstream traffic, downstream traffic, total traffic. Click **Details** in the list to view the line chart.
  - Cloud Application: Select the Cloud Application tab to display the cloud application information of selected user.
  - Traffic: Select the Traffic tab to display the traffic trends of selected user .
  - Concurrent Sessions: Select the Concurrent Sessions tab to display the concurrent sessions trends of selected user .
- Frame a region's trends with the mouse. You can enlarge the scope of the displayed time period. Click Reset zoom to restore the default size of the trend.
- Within the user entry list, hover your cursor over a user entry, and there is a button to its right. Click this button and select **Add to Black List**.

Address Book Details

Click **Monitor>User >Address Book Details**.



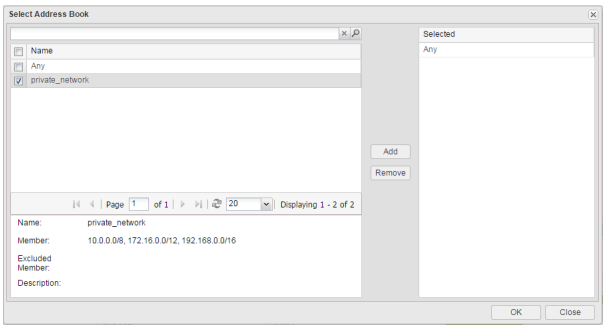
- Click + Filter to select the condition in the drop-down list to search the desired address entry.
- To view the detailed information of a address entry, select the address entry in the list.
  - Application (real-time): Select the Application (real-time) tab to displays the detailed information of the upstream traffic, downstream traffic, and total traffic. Click **Details**in the list to view the line chart.
  - Cloud Application: Select the Cloud Application tab to display the cloud application information of selected address book.
  - Traffic: Select the Traffic tab to display the traffic trends of selected address entry.
  - Concurrent Sessions: Select the Concurrent Sessions tab to display the concurrent sessions trends of selected address entry.

The monitor address is a database that stores the users' address which is used for the statistics.

Monitor Address Book

The monitor address is a database that stores the user 's address which is used for statistics.

Click **Monitor > User > Select Address Book**, and Click Select Address Book at the top left corner.



In this dialog box, you can perform the following actions:

- Select the address entry check box, and click **Add** to add a new address entry to the **Selected** list.
- In the **Selected** list, select the address entry and click **Remove** for the address entry not be counted.
- Below the list shows the details of the selected address entry.

Statistical Period

System supports the predefined time cycle and the custom time cycle. Click the time button on the top right corner of each tab to set the time cycle.

- Real-time: Displays the current statistical information.
- Last Hour: Displays the statistical information within the latest 1 hour.
- Last Day: Displays the statistical information within the latest 1 day.
- Last Month: Displays the statistical information within the latest 1 month.

Application Monitor

This feature may vary slightly on different platforms. If there is a conflict between this guide and the actual page, the latter shall prevail.

Application monitor displays the statistics of applications, application categories, application subcategories, application risk levels, application technologies, and application characteristics within the specified period (Realtime, latest 1 hour, latest 1 day, latest 1 month) .The statistics include the application traffic and applications' concurrent sessions.

If IPv6 is enabled, system will support to monitor both IPv4 and IPv6 address.

Summary

The summary displays the following contents during a specified period:

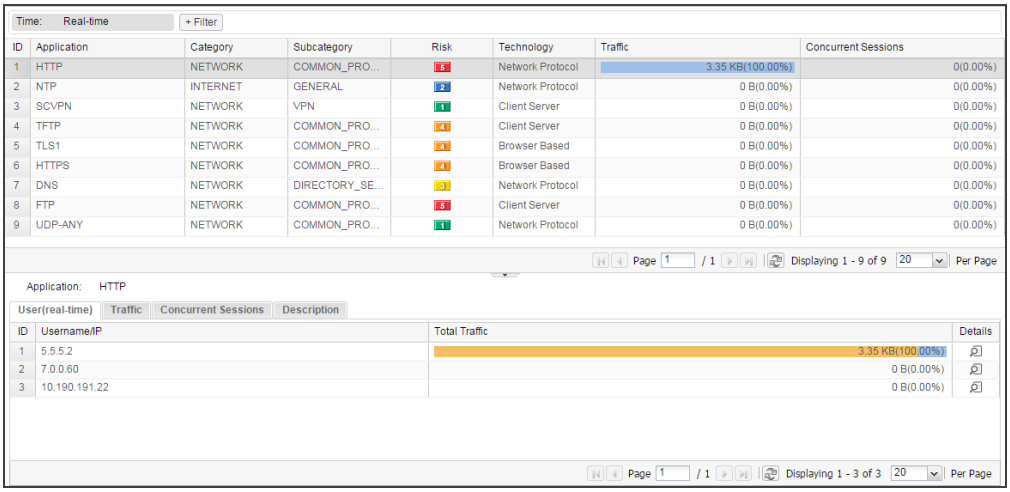
- The concurrent sessions of top 10 hot and high-risk applications.
- The traffic/concurrent sessions of top 10 applications.
- The traffic/concurrent sessions of top 10 application categories.
- The traffic/concurrent sessions of top 10 application subcategories.
- The traffic/concurrent sessions organized by application risk levels.
- The traffic/concurrent sessions organized by application technologies.
- The traffic/concurrent sessions organized by application characteristics.

Click **Monitor>Application>Summary**.

- Select different Statistical_Period to view the statistical information in different periods of time.
- From the drop-down menu, specify the type of statistics: Traffic or Concurrent Sessions.
- Click to refresh the monitoring data in this page.
- Hover your mouse over a bar or a pie graph to view the concrete statistical values of total trafficor concurrent sessions .

Application Details

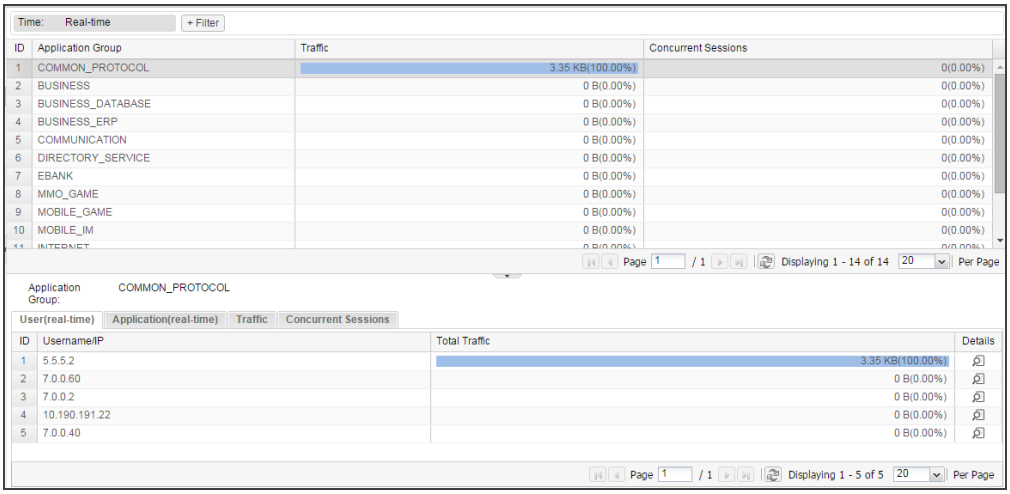
Click **Monitor > Application > Application Details**.



- Click the **Time** drop-down menu to select different Statistical_Period to view the statistical information in that periods of time.
- Click + Filter button and select **Application** in the drop-down menu. You can search the desired application by entering the keyword of the application's name in the text field.
- To view the detailed information of a certain application, select the application entry in the list.
  - Users(real-time): Select the Users (real-time)tab to displays the detailed information of users who are using the selected application. Click in details column to see the trends of upstream traffic, downstream traffic, total traffic .
  - Traffic: Select the Traffic tab to display the traffic trends of selected application.
  - Concurrent Sessions: Select the Concurrent Sessions tab to display the concurrent sessions trends of the selected application.
  - Description: Select the Description tab to displays the detailed information of the selected application.

Group Details

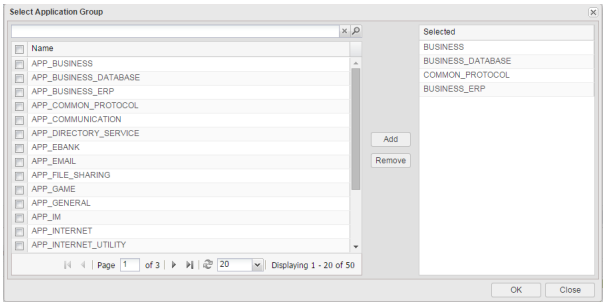
Click **Monitor>Application>Group Details**.



- Click **Time** drop-down menu to select a different Statistical_Period to view the statistical information in that periods of time.
- Click + Filter button and select **Application Group** in the drop-down menu. You can search the desired application group by entering the keyword of the application group name in the text field.
- To view the detailed information of a certain application group, select the application group entry in the list.
  - User(real-time): Select the Users(real-time)tab to display the detailed information of users who are using the selected application group.Click in details column, you can see the trends of the upstream traffic, downstream traffic, total traffic .
  - Application(real-time): Select the Application(real-time) tab to display the detailed information of applications in use which belongs to the selected application group. Click in details column to see the trends of the upstream traffic, downstream traffic, total traffic of the selected application.
  - Traffic: Select the Traffic tab to display the traffic trends of selected application group.
  - Concurrent Sessions: Select the Concurrent Sessions tab to display the concurrent sessions trends of the selected application group.
  - Description: Select the Description tab to display the detailed description of the selected application.

Select Application Group

Click **Monitor>Application>Select Application Group**.Click Select Application Group on the top left corner to configure the application groups required to be counted in the **Select Application Group** dialog box. There are global application groups in the left column.



In this dialog box, you can perform the following actions:

- Select the application groups check box, and click **Add** to add a new application groups entry to the **Selected** list.
- In the **Selected** list, select the application group entries and click **Remove** for the application group entries not to be counted.

Statistical Period

System supports the predefined time cycle and the custom time cycle. Click **Real-time** on the top right corner of each tab to set the time cycle.

- Real-time: Displays the current statistical information.
- Last 60 Minutes: Displays the statistical information within the latest 1 hour.
- Last 24 Hours: Displays the statistical information within the latest 1 day.
- Last 30 Days: Displays the statistical information within the latest 1 month.

Cloud Application Monitor

This feature may vary slightly on different platforms and not be available in VSYS on a part of platforms. If there is a conflict between this guide and the actual page, the latter shall prevail.

A cloud application is an application program that functions in the cloud. It resides entirely on a remote server and is delivered to users through the Internet.

Cloud application monitor page displays the statistics of cloud applications and users within a specified period (real-time, latest 1 hour, latest 1 day, latest 1 month), including application traffic, user number, and usage trend.

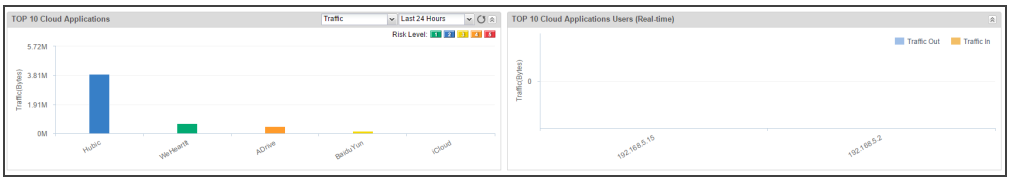
If IPv6 is enabled, system will support to monitor both IPv4 and IPv6 address.

Summary

The summary displays the following contents during a specified period:

- Top 10 cloud application rank by traffic/concurrent session number with in a specified period (realtime, latest 1 hour, latest 1 day, latest 1 month).
- Top 10 cloud application user rank.

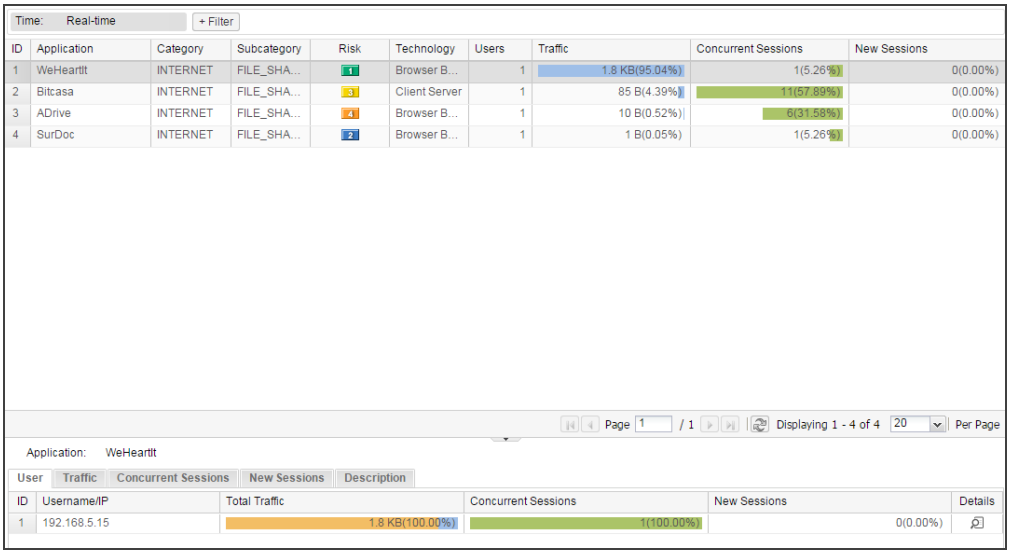
Click **Monitor > Cloud Application > Summary**.



- By selecting different filters, you can view the statistics of different time period.
- By selecting the drop-down menu of trafficor concurrent sessions, you can view your intended statistics.
- Click the update  icon to update the displayed data.
    - Hover your cursor over bar or pie chart to view exact data. Click the **Details** link on hover box, and you will jump to the **Cloud Application Details** page.

Cloud Application Details

Click **Monitor > Cloud Application >Cloud Application Details**.



- Click the Time drop-down menu to select different time period to view the statistics in that period.
- Click the **Filter** button, and select **Application**. In the new text box, enter the name of your intended application.
- To view the detailed information of a certain application group, select the application group entry in the list.
  - User(real-time): Select the Users(real-time)tab to display the detailed information of users who are using the selected application group. Click  in details column to see the trends of the upstream traffic, downstream traffic, total traffic .
  - Application(real-time): Select the Application(real-time) tab to display the detailed information of applications in use which belongs to the selected application . Click  in details column to see the trends of the upstream traffic, downstream traffic, total traffic of the selected application.
  - Traffic: Select the Traffic tab to display the traffic trends of selected application.
  - Concurrent Sessions: Select the Concurrent Sessions tab to display the concurrent sessions trends of the selected application.
  - Description: Select the Description tab to display the detailed description of the selected application.

Statistical Period

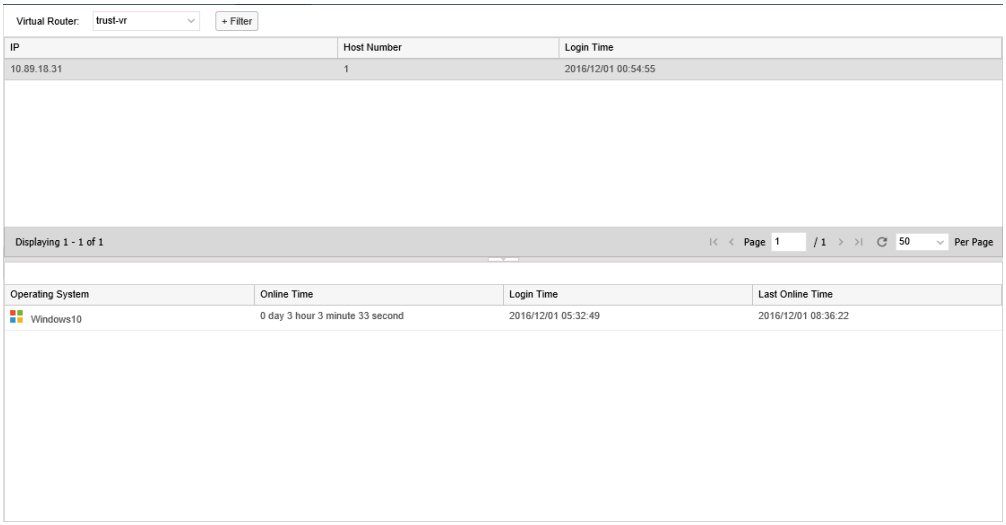
System supports the predefined time cycle and the custom time cycle. Click **Real-time** on the top right corner of each tab to set the time cycle.

- Real-time: Displays the current statistical information.
- Last 60 Minutes: Displays the statistical information within the latest 1 hour.
- Last 24 Hours: Displays the statistical information within the latest 1 day.
- Last 30 Days: Displays the statistical information within the latest 1 month.

Share Access Detect

To detect the users' private behavior of shared access to the Internet, system supports to analyze the User-agent filed of HTTP packet, a share access detect method which is based on the application characteristic. The share access detect page can display the share access detect information with specified filter condition. The aging time of share access detect information is 2 hours.

Click **Monitor> Share Access Detect**.

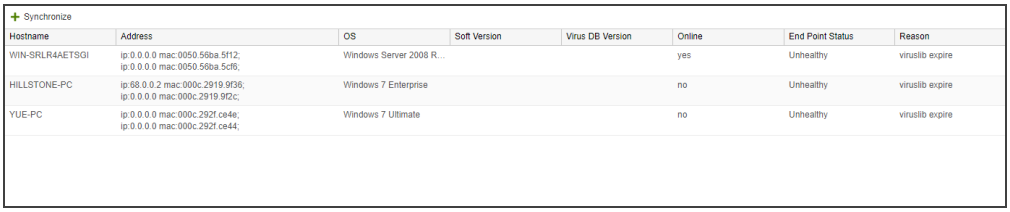


- From **Virtual Router** drop-down menu, select the virtual router the IP belongs to. By default ,it is trust-vr.
- Click the **Filter** button and select **IP**. In the drop-down menu, select the source IP's IP information you want to view. You can select 1 IP address.
- Click the **Filter** button and select **Host Number>=**. In the drop-down menu, select the minimum host number of IP information you want to view.
- After configuring filter condition, the upside list will display the information of IP, host number and IP login time, which is matched with the configured filter condition. Click an entry of IP information and the downside list will display the share access detect of this IP, which includes operation system, online time, login time and last online time of users.

End Point Detect

If system is configured with "Configuring End Point Security Control Center Parameters" on Page 279, the endpoint detect page displays the endpoint data information list synchronized with the endpoint security control center.

Click **Monitor** > **End Point Detect**.



- Click the **+ Synchronizated** button to synchronize endpoint data with terminal security control center.

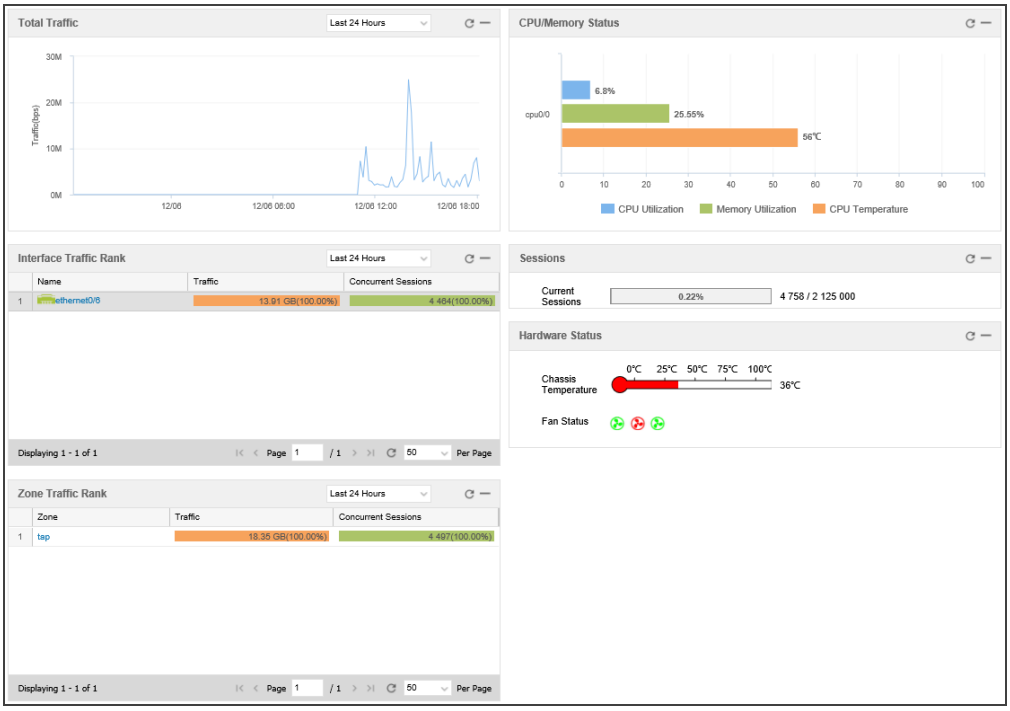
Device Monitor

This feature may vary slightly on different platforms. If there is a conflict between this guide and the actual page, the latter shall prevail.

The Device page displays the device statistics within the specified period, including the total traffic, interface traffic, zone traffic, CPU/memory status, sessions, hardware status and online IP.

Summary

The summary displays the device statistics within last 24 hours. Click **Monitor>Device>Summary**.

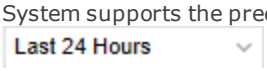


- Total traffic: Displays the total traffic within the specified statistical period.
  - Hover your mouse over the chart to view the total traffic statistics at a specific point in time.
  - Select a different Statistical Period to view the statistical information in that period of time.
  - If IPv6 is enabled, the device traffic will show the total traffic of IPv4 and IPv6.
- Interface traffic: Displays the upstream traffic, downstream traffic, total traffic and concurrent sessions of interface within the specified statistical period by rank.
  - Click **Traffic In**, **Traffic Out**, **Traffic**, or **Concurrent Sessions**. System displays the interface traffic according to the value(from large to small) of the specified object. By default, the interface traffic is displayed according to the total traffic value of interface.
  - Select a different Statistical Period to view the statistical information in that period of time.
  - Click the interface name to view the Detailed Information.
  - If IPv6 is enabled, the interface traffic will show the traffic of IPv4 and IPv6.
- Zone traffic: Displays the upstream traffic, downstream traffic, total traffic and concurrent sessions of zone within the specified statistical period by rank.

- Click **Traffic In**, **Traffic Out**, **Traffic**, or **Concurrent Sessions**. System displays the zone traffic according to the value(from large to small) of the specified object. By default, the zone traffic is displayed according to the total traffic value of zone.
- Select a different Statistical Period to view the statistical information in that period of time.
- Click the zone name to view the Detailed Information.

- Hardware status: Displays the real-time hardware status, including storage, chassis temperature and fan status.
  - Storage: Displays the percentage of disk space utilization.
  - Chassis temperature: Displays the current CPU/chassis temperature.
  - Fan status: Displays the operation status of the fan. Green indicates normal, and red indicates error or a power supply module is not used.
- Sessions: Displays the current sessions utilization.
- CPU/memory status: Displays current CPU utilization, memory utilization and CPU temperature statistics.
  - Click legends of **CPU Utilization**, **Memory Utilization** or **CPU Temperature** to specify the histogram statistical objects. By default, it displays statistics of all objects.

Statistical Period

System supports the predefined time cycle. Select statistical period from the drop-down menu 

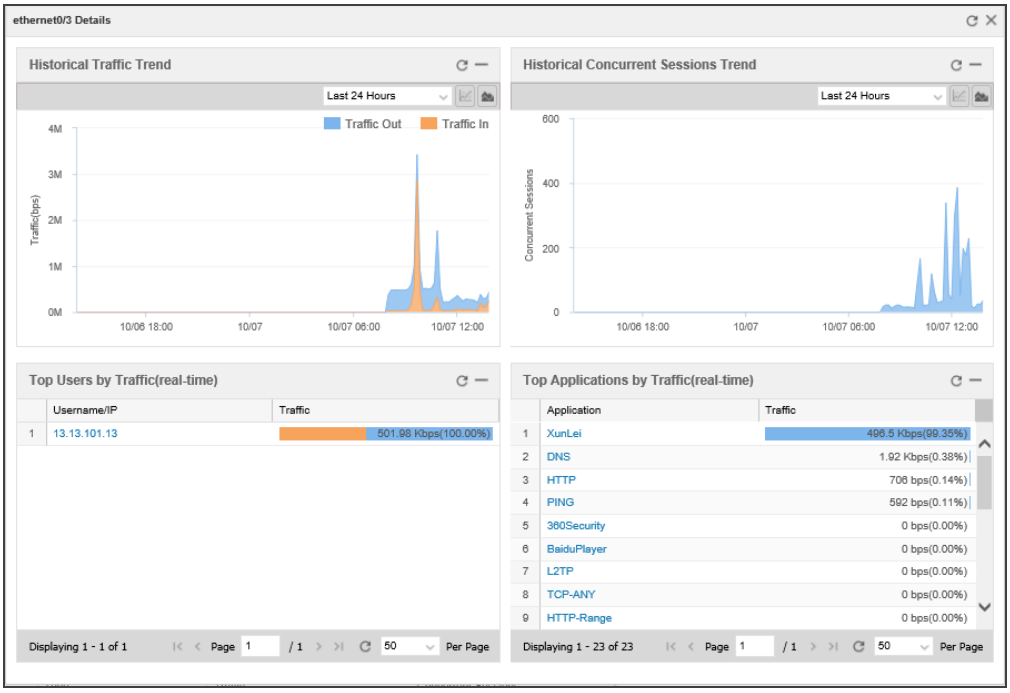
at the top right corner of some statistics page to set the time cycle.

- Real-time: Displays the current statistical information.
- Last 60 Minutes: Displays the statistical information within the latest 1 hour.
- Last 24 Hours: Displays the statistical information within the latest 1 day.
- Last 30 Days: Displays the statistical information within the latest 1 month.

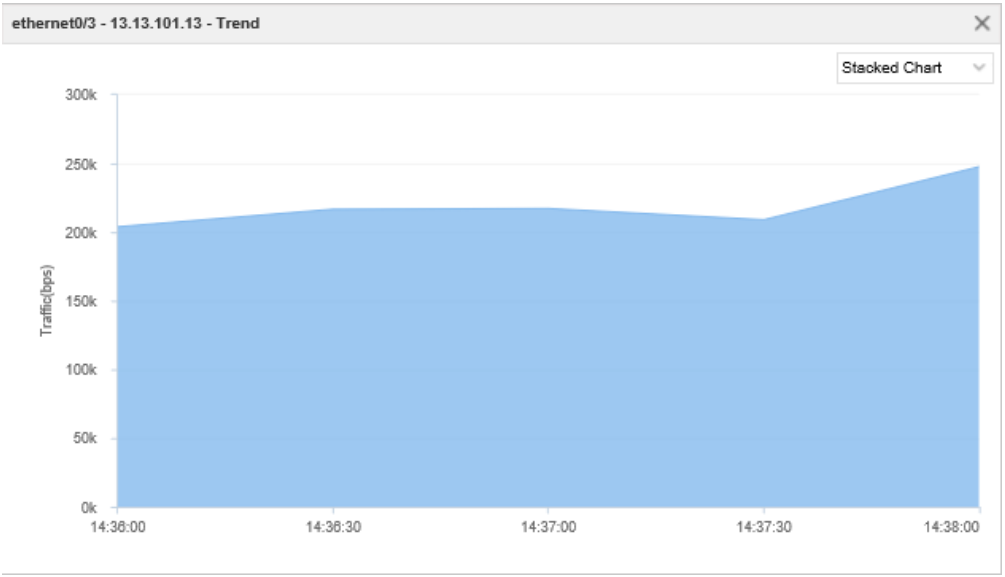
Detailed Information

The detailed information page displays detailed statistics of certain monitored objects. In addition, in the detailed information page, hover your mouse over the chart that represents a certain object to view the statistics of history trend and other information.

For example, click **ethernet0/0** in the Interface Traffic , and the detailed information of ethernet0/0 appears.



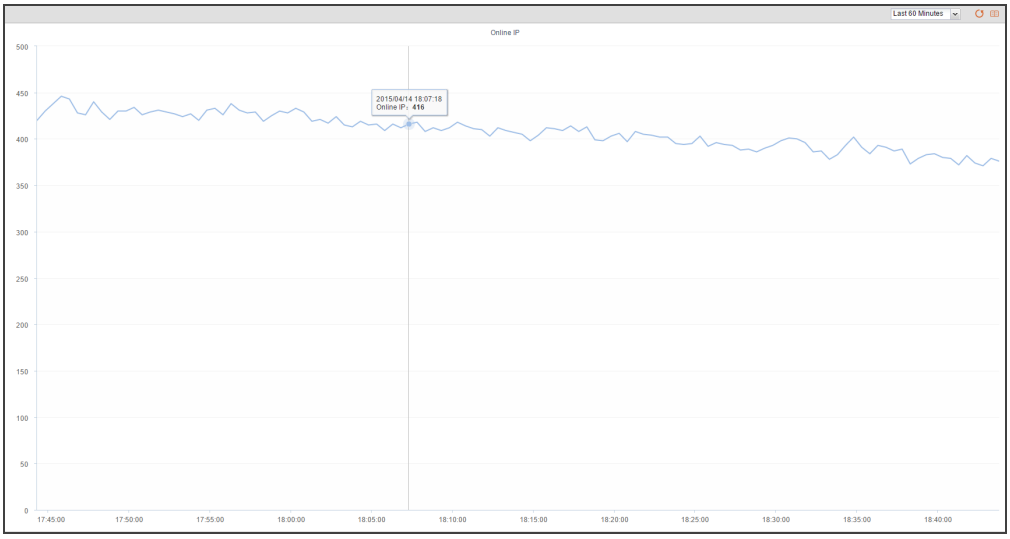
- Icon  and  are used to switch the line chart and stacked chart, which display the history trend of sessions and concurrent sessions.
- In traffic trend section, click legends of **Traffic In** or **Traffic Out** to specify the statistical objects. By default, it displays all statistical objects.
- In the User or Application section, click **Username/IP** or **Application** to display the real-time trend of the specified user or application. For example, the user traffic trend is shown as below.



- Select line chart or stacked chart from the pop-up menu  at the top right corner .
- Hover your mouse over the chart to view the session statistics at a specific point in time.

Online IP

Click **Monitor>Device>Online IP** to view the historical trend of the number of online users. You can select the statistical period as last 60 minutes, last 24 hours or last 30 days.



- Hover your mouse over the line to view online users information.

URL Hit

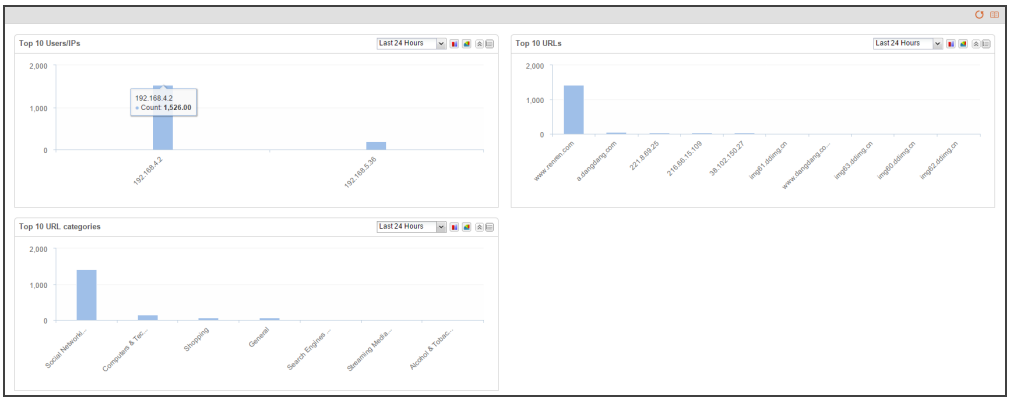
This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

If the "URL Filter" on Page 237 function is enabled in the security policy rule, the predefined stat-set of URL filter can gather statistics on user/IPs, URLs and URL categories.

If IPv6 is enabled, system will support to monitor both IPv4 and IPv6 address.

Summary

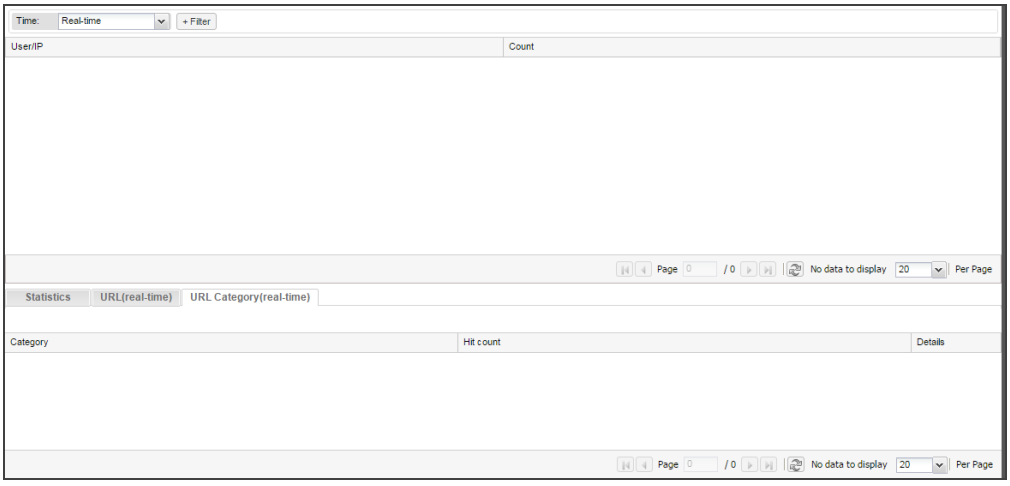
Click **Monitor> URL Hit>Summary**.



- Select a different Statistical_Period to view the statistical information in that period of time.
- Hover your mouse over a bar, to view the hit count of user/IP, URL or URL Category .
- Click at top-right corner of every table and enter the corresponding details.
- Click Stacked Chart to switch between the bar chart and the pie chart.

User/IP

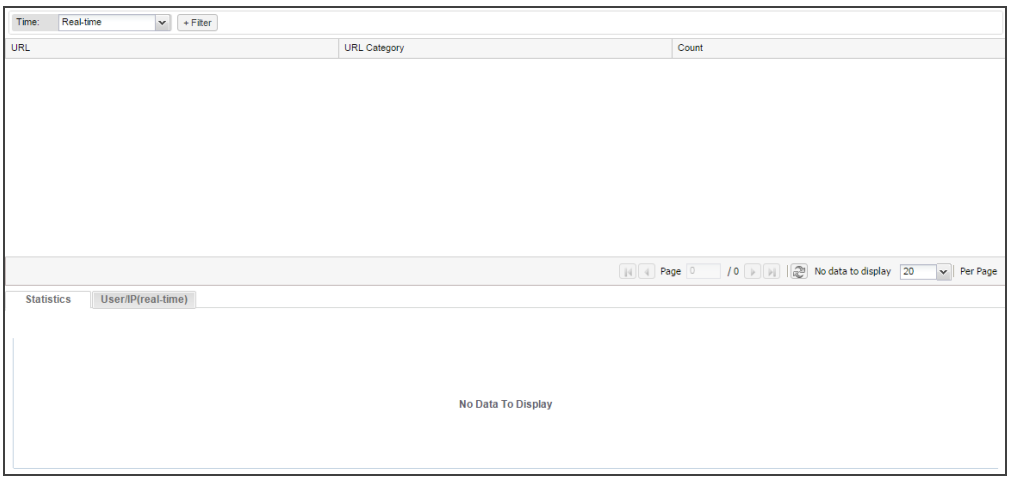
Click **Monitor> URL Hit>User/IP**.



- The user/IPs and detailed hit count are displayed in the list below.
- Click a user/IP in the list to display the corresponding URL hit statistics in the curve chart below.
  - Statistics: Displays the hit statistics of the selected User/IP, including the real-time statistics and statistics for the latest 1 hour, 24 hours 30 days .
  - URL(real-time): Displays the URLs' real-time hit count of selected User/IP. Click URL link ,you can view the corresponding URLs detailed statistics page.Click **Detail** link,you can view the URL hit trend of the selected User/IP in the **URL Filter Details**dialog .
  - URL category(real-time): Displays the URL categories' read-time hit count of selected user/IP. Click URL category link , you can view the corresponding URL categories' detailed statistics page. Click **Detail** link, you can view the URL category hit trend of the selected user/IP in the pop-up dialog .
- Click Filter at top-right corner and then click the **Filter** button at top-left corner. Select **User/IP** and you can search the user/IP hit count information by entering the keyword of the username or IP.

URL

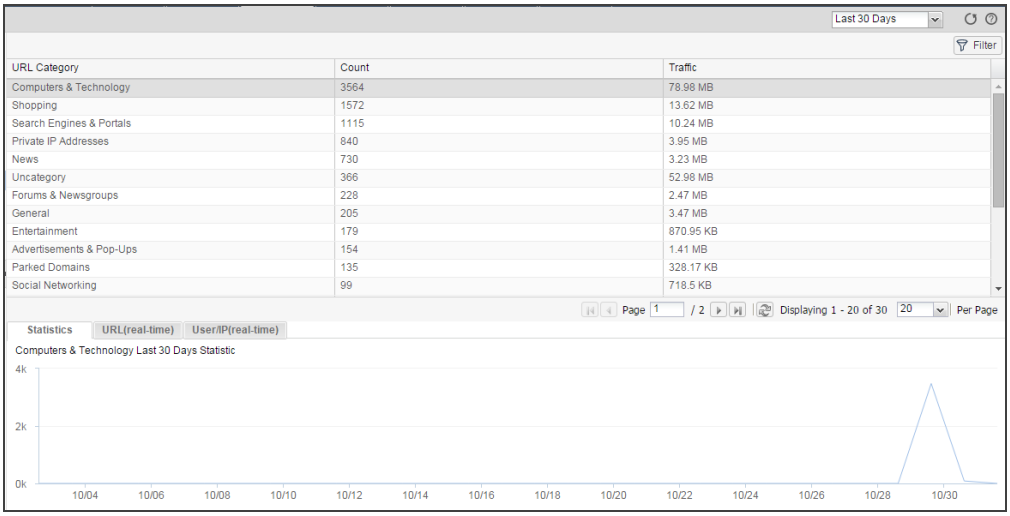
Click **Monitor > URL Hit > URL**.



- The URL, URL category and detailed hit count are displayed in the list below.
- Click a URL in the list to view its detailed statistics.
  - Statistics: Displays the hit statistics of the selected URL, including the real-time statistics and statistics for the latest 1 hour, 24 hours 30 days .
  - User/IP(real-time): Displays the User/IP's real-time hit count of selected URL. Click the User/IP link and you can view the corresponding user/IPs detailed statistics page. Click the **Detail** link and you can view the URL hit trend of the selected user/IP in the **URL Filter Details** dialog box.
- Click Filter at the top-right corner and then click the **Filter** button at the top-left corner. Select **URL**and you can search the URL hit count information by entering the keyword of the URL.
- Click to refresh the real-time data in the list.

URL Category

Click **Monitor> URL Hit > URL Category**.



- The URL category, count, traffic are displayed in the list.
- Click a URL category in the list to view its detailed statistics displayed in the Statistics, URL(real-time), User/IP (real-tiime) tabs.
  - Statistics: Displays the trend of the URL category visits, including the real-time trend and the trend in the last 60 minutes, 24 hours , 30 days.
  - URL(real-time): Displays the visit information of the URLs, contained in the URL category, that are being visited.
  - User/IP(real-time): Displays the visit information of the users or IPs that are visiting the URL category.
- Click  to refresh the real-time data in the list.

Statistical Period

System supports the predefined time cycle and the custom time cycle. Click the time button on the top right corner of each tab to set the time cycle.

- Real-time: Displays the current statistical information.
- Last 60 Minutes: Displays the statistical information within the latest 1 hour.
- Last 24 Hours: Displays the statistical information within the latest 1 day.
- Last 30 Days: Displays the statistical information within the latest 1 month.

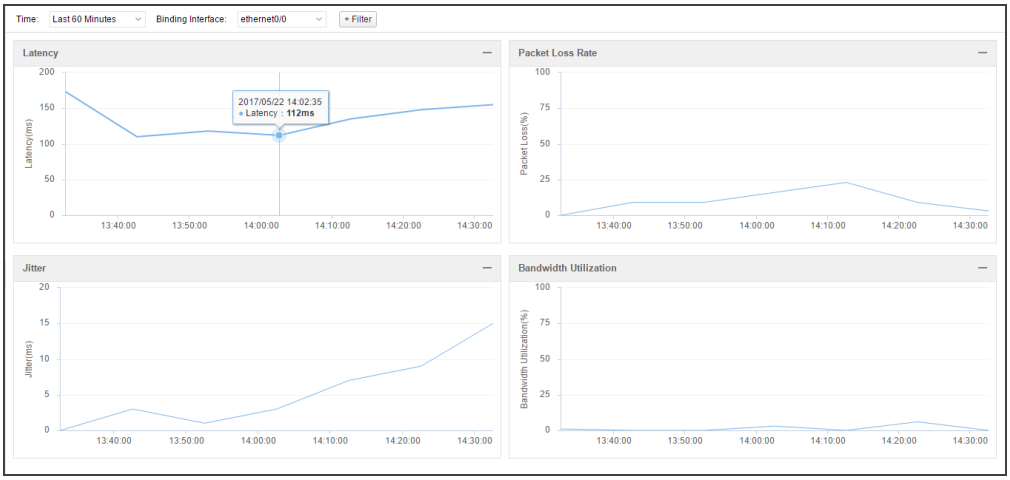
Link State Monitor

Link state monitoring can calculate the sampling traffic information of the specific interface in the link, including latency, packet loss rate, jitter, and bandwidth utilization, to monitor and display the overall status of the link.

Link state monitor page displays the traffic statistics of the interfaces that have been bound within a specified period (Realtime, latest 1 hour, latest 1 day, latest 1 month) .

Link State

The link state page displays traffic statistics for all binding interfaces. Click **Monitor > Link State Monitor.** For more information about configuration of binding interfaces, refer to Link Configuration.



- Select a different Statistical_Period to view the statistical information in that periods of time.
- Select the binding interface **Binding Interface** drop-down list, Click the **Binding Interface** drop-down menu and select the interface name to view the link status monitoring statistics for this interface.
- Click + Filter button and select **Nat-Pool** in the drop-down menu. You can select the NAT address pool name to view the link status monitoring statistics according to the specified NAT address pool.
- Click + Filter button and select **Application** in the drop-down menu. You can select the TOP 10 or Application / Application group name to view the link status monitoring statistics according to the specified application.

Note:

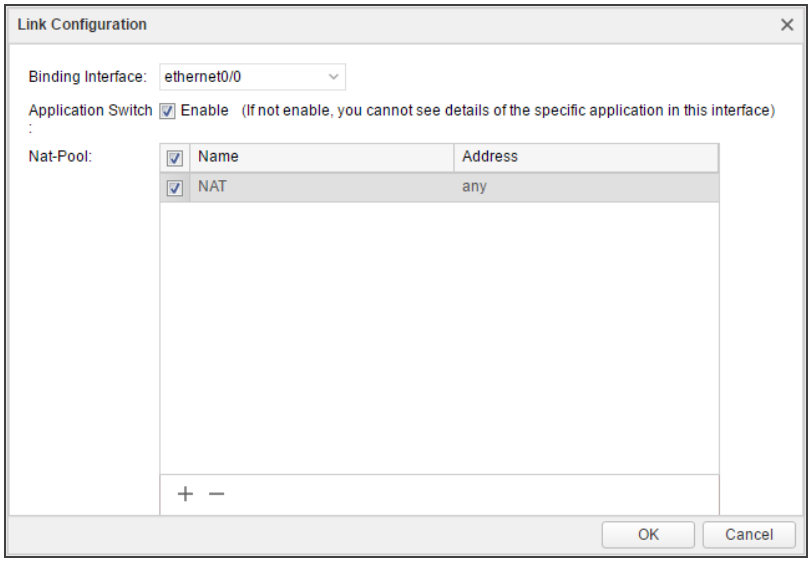
- "Time" and "Binding Interface" are required in the filter condition.
- If the application switch of the specified interface is not enabled in the link configuration, the **Application** filter condition cannot be added.

Link Configuration

In the link configuration page, you can configure the binding interface to monitor the link state and can enable the application switch to specify the NAT address pool as needed.

To configure the link, take the following steps:

1. Click **Monitor > Link State Monitor > Link Configuration**.
2. Click **New**.



In the Link Configuration dialog box, configure these values

Option	Description
Binding Interface	Select the interface in the drop down menu.
Application Switch	Select **Enable** check box. After enabling, you can see details of the specific application in this interface.
Nat-Pool	After adding the NAT pool, system will classify statistics according to the NAT pool IP address for link interface traffic. • Click **+** button to add a NAT pool. • Type in the NAT pool name in the text box under the **Name**. • In the **Address** drop down menu, select the address book to add to the NAT address pool. By default, system uses the address entry of **any**, which means the NAT pool will be executed on all traffic. Select the NAT pool item, click **-**button to delete the NAT pool.

3. Click **OK**.

Statistical Period

System supports the predefined time cycle and the custom time cycle. Click **Real-time** on the top right corner of each tab to set the time cycle.

- Real-time: Displays the current statistical information.
- Last 60 Minutes: Displays the statistical information within the latest 1 hour.
- Last 24 Hours: Displays the statistical information within the latest 1 day.
- Last 30 Days: Displays the statistical information within the latest 1 month.

Application Block

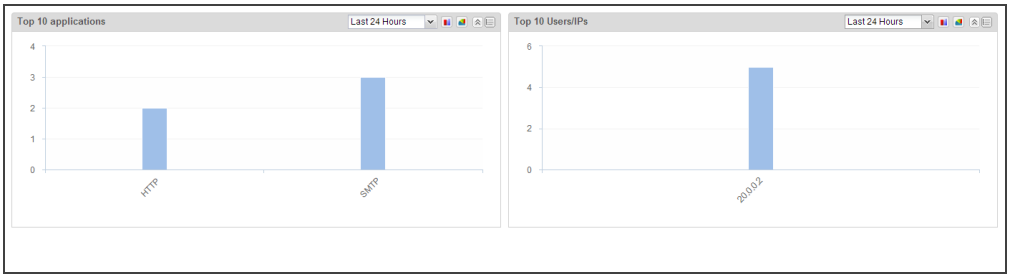
This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

If system is configured with "Security Policy" on Page 281 the application block can gather statistics on the applications and user/IPs.

If IPv6 is enabled, system will support to monitor both IPv4 and IPv6 address.

Summary

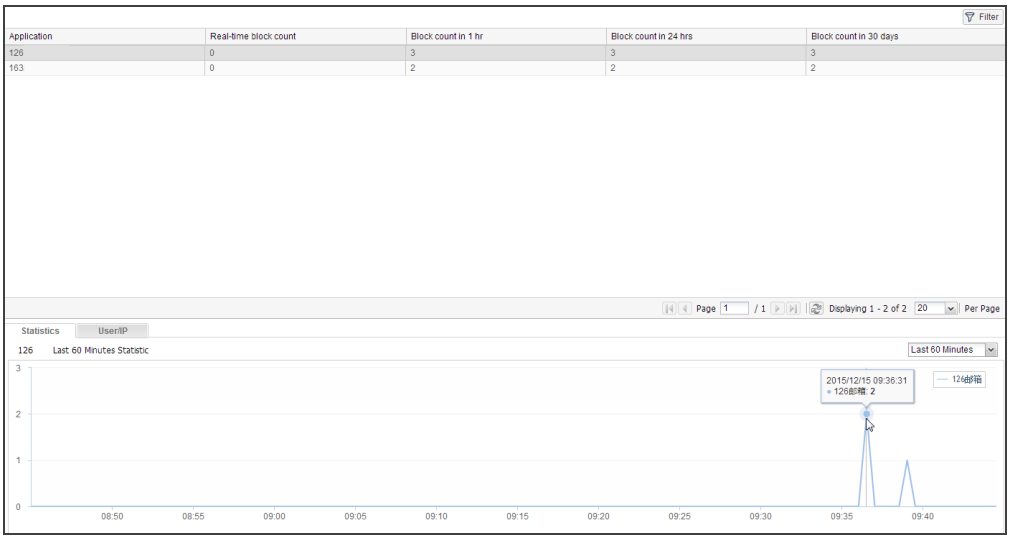
The summary displays the application block's statistics on the top 10 applications and top 10 user/IPs. Click **Monitor>Application Block> Summary**.



- Select a different Statistical_Period to view the statistical information in that period of time.
- Hover your mouse over a bar to view the block count on the applications and user/IPs.
- Click at the top-right corner of every table and enter the corresponding details page.
- Click Stacked Chart to switch between the bar chart and the pie chart.

Application

Click **Monitor>Application Block> Application**.



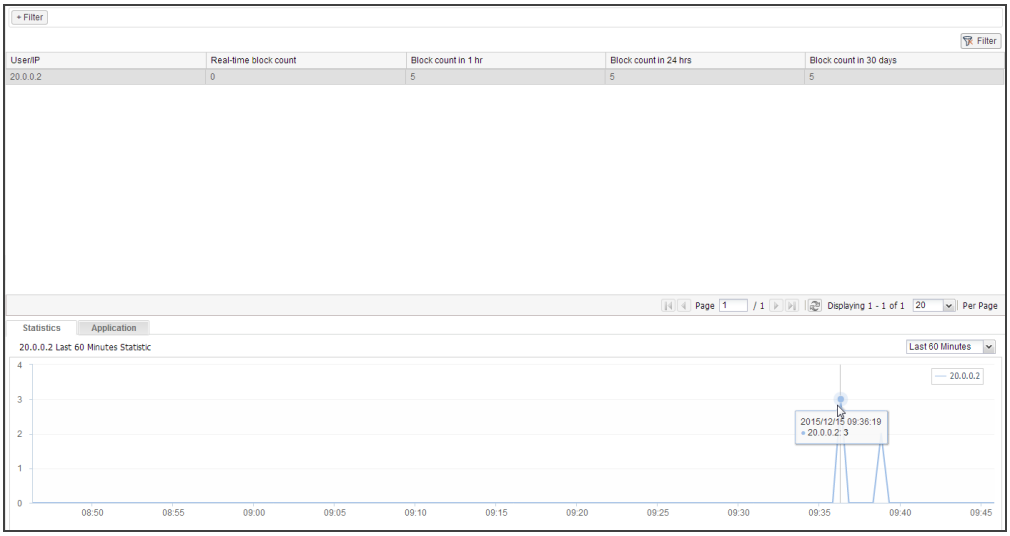
- The applications and detailed block count are displayed in the list below.
- To view the corresponding information of application block on the applications and user/IPs, select the application entry in the list.

- Statistics: Displays the block count statistics of the selected application, including the real-time statistics and statistics for the latest 1 hour, 24 hours and 30 days.
- User/IP: Displays the user/IPs that are blocked from the selected application. Click a user/IP in the list to display the corresponding block count statistics in the curve chart below. Click to jump to the corresponding user / IPs page.

- Click Filter, and then click + Filter to select the condition in the drop-down list. You can search the application block information by entering the keyword of the application name.
- Click to refresh the real-time data in the list.

User/IP

Click **Monitor>Application Block> User/IP**.



- The user/IP and detailed block count are displayed in the list below.
- Click a user/IP in the list to display the corresponding block count statistics in the curve chart below. Click to jump to the corresponding user / IPs page.
- Click Filter, and then click + Filter to select the condition in the drop-down list. You can search the users/IPs information.

Statistical Period

System supports the predefined time cycle and the custom time cycle. Click (Realtime) on the top right corner of each tab to set the time cycle.

- Realtime: Displays the statistical information within the realtime.
- Last Hour: Displays the statistical information within the latest 1 hour.
- Last Day: Displays the statistical information within the latest 1 day.
- Last Month: Displays the statistical information within the latest 1 month.

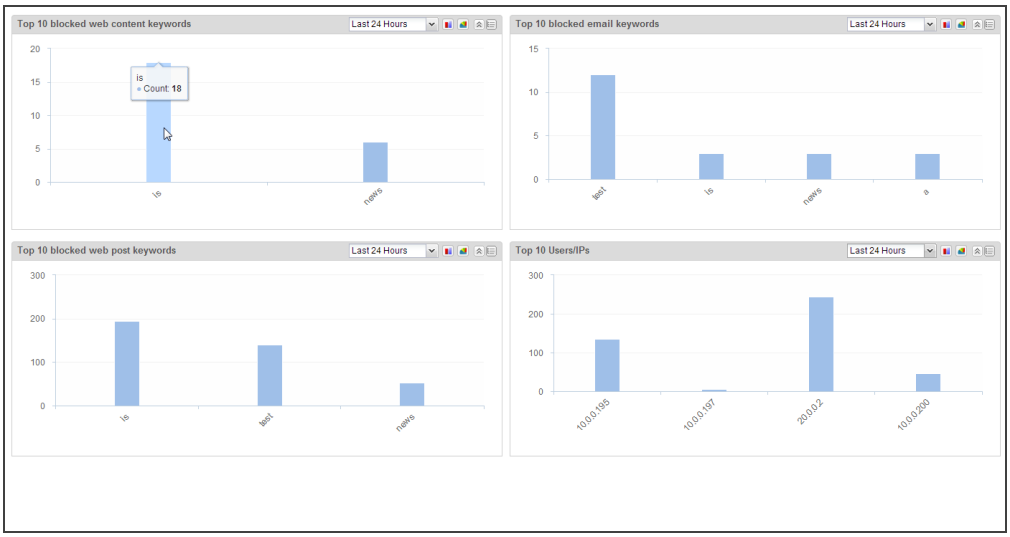
Keyword Block

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

If system is configured with "Web Content" on Page 260, "Email Filter" on Page 266, or "Web Posting" on Page 263, the predefined stat-set of the Keyword Block can gather statistics on the Web keyword, Web keywords, email keywords, posting keywords and users/IPs.

Summary

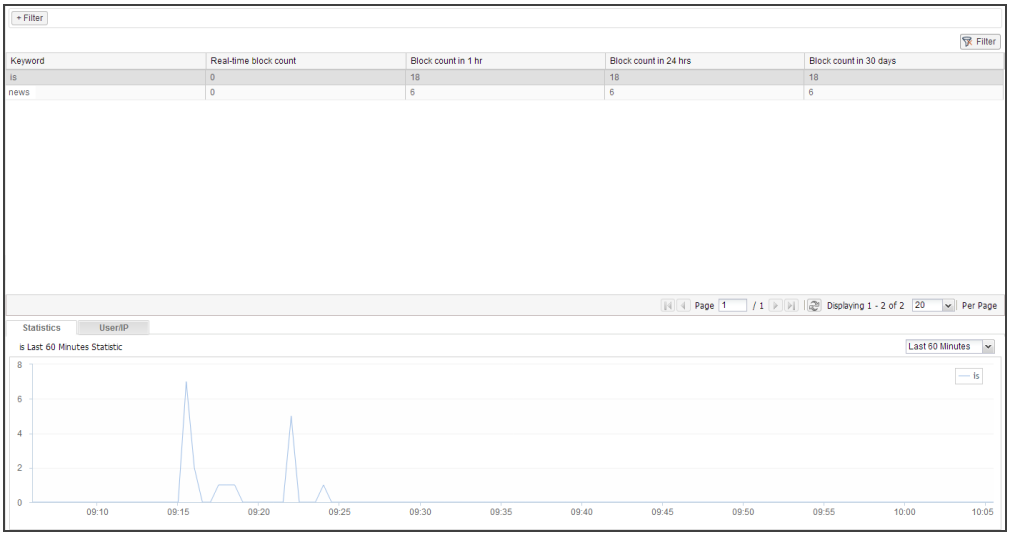
The summary displays the predefined stat-set of the Keyword Block that can gather statistics on the top 10 hit Web keywords, the top 10 hit email keywords, the top 10 posting keywords, and the top 10 users/IPs. Click **Monitor > Keyword Block > Summary**.



- Select a different Statistical_Period to view the statistical information in that period of time.
- Hover your mouse over a bar to view the block count on the keywords .
- Click at the top-right corner of every table and enter the corresponding details page.
- Click Stacked Chart to switch between the bar chart and the pie chart.

Web Content

Click **Monitor>Keyword Block> Web Content**.



- The Web content and detailed block count are displayed in the list below.
- To view the corresponding information of keyword block on the Web content, select the keyword entry in the list.
  - Statistics: Displays the statistics of the selected keyword, including the real-time statistics and statistics for the latest 1 hour, 24 hours and 30 days.
  - User/IP: Displays the user/IPs that are blocked by the selected keyword. Click a user/IP in the list to display the corresponding block count statistics in the curve chart below. Click to jump to the corresponding user / IPs page.
- Click Filter, and then click + Filter to select the condition in the drop-down list. You can search the keyword block information by entering the keyword .
- Click to refresh the real-time data in the list.

Email Content

Click **Monitor>Keyword Block> Email Content**.

For a page description, see Web_Content.

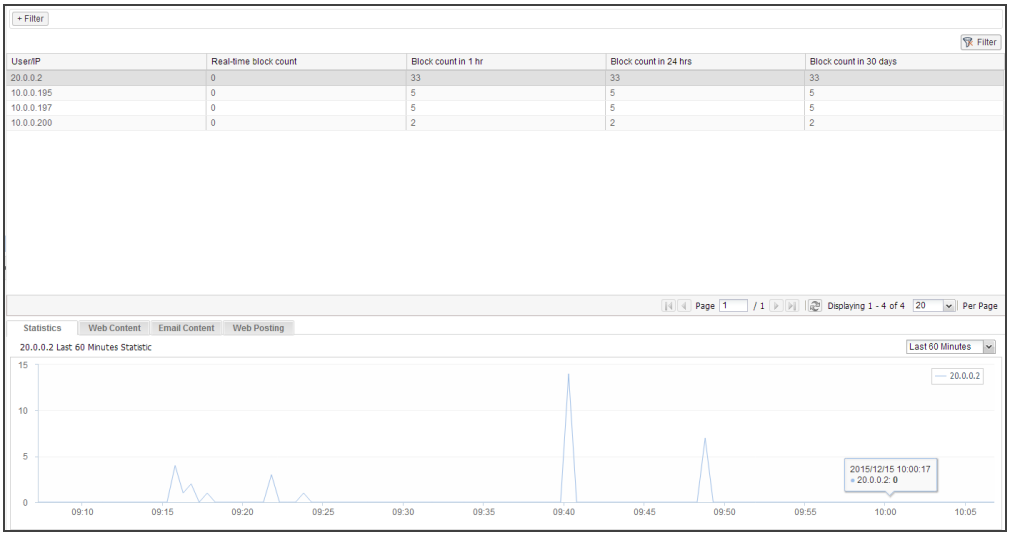
Web Posting

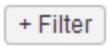
Click **Monitor>Keyword Block>Web Posting**.

For a page description, see Web_Content.

User/IP

Click **Monitor>Keyword Block>User/IP**.



- The user/IP and detailed block count are displayed in the list below.
- Click a user/IP in the list to display the corresponding statistics , Web content, Email Content, Web Posting in the curve chart below. Click  to jump to the corresponding detail page.
- Click  , and then click  to select the condition in the drop-down list. You can search the user-s/IPs information .

Statistical Period

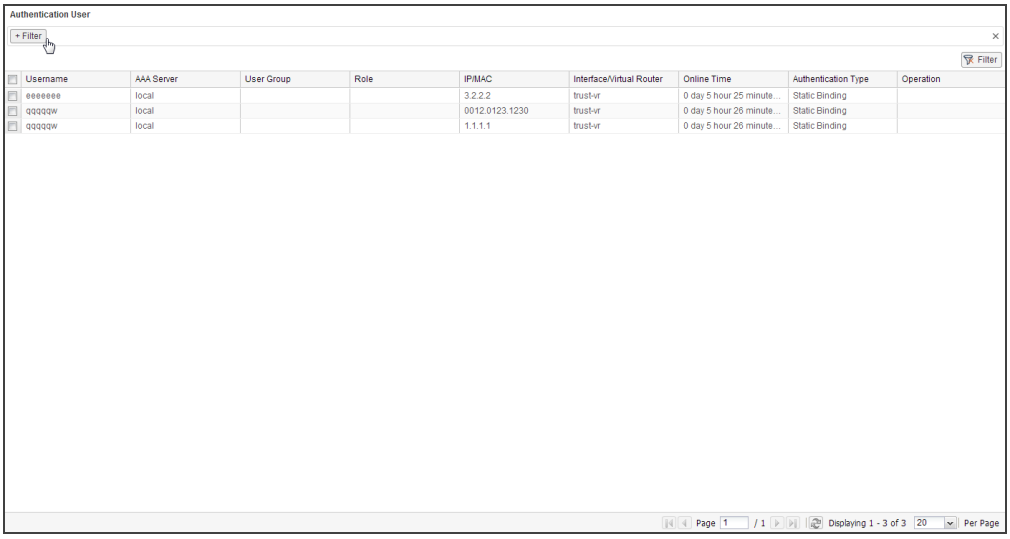
System supports the predefined time cycle and the custom time cycle. Click () on the top right corner of each tab to set the time cycle.

- Real-time: Displays the current statistical information.
- Last Hour: Displays the statistical information within the latest 1 hour.
- Last Day: Displays the statistical information within the latest 1 day.
- Last Month: Displays the statistical information within the latest 1 month.

Authentication User

If system is configured with"Web Authentication" on Page 89, "Single Sign-On" on Page 96, "SSL VPN" on Page 137, "L2TP VPN" on Page 196 the authentication user can gather statistics on the authenticated users.

Click **Monitor>Authentication User**.



- Click Filter, and click + Filter to select the condition in the drop-down list to filter the users.
- Click **Kick Out** under the Operation column to kick the user out.
- Click to refresh the real-time data in the list.

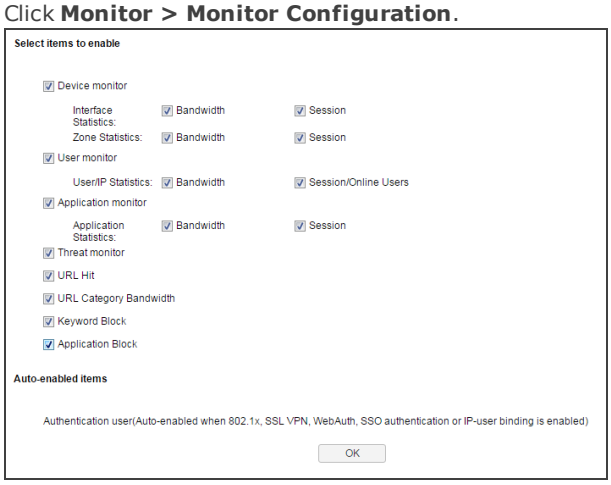
Monitor Configuration

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

You can enable or disable some monitor items as needed. The monitor items for Auth user are enabled automatically.

To enable/disable a monitor item, take the following steps:

1. Click **Monitor > Monitor Configuration**.



2. Select or clear the monitor item(s) you want to enable or disable.
3. Click **OK** .

Note: After a monitor item is enabled or disabled in the root VSYS, the item of all VSYSs will be enabled or disabled(except that the non-root VSYS does not support this monitor item). You can not enable or disable monitor item in non-root VSYSs.

User-defined Monitor

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

A user-defined stat-set provides a more flexible approach to view the statistics. You can view the statistics as needed. The statistical data may vary in the data types you have selected.

If IPv6 is enabled, system will support to monitor both IPv4 and IPv6 address.

The IP type-based statistical information table.

Direction	Condition	Data type					
		Traffic	Session	Ramp-up rate	URL hit count	Keyword block count	Application block count
No direction	Initiator	Statistics on the traffic of the initiator's IP	Statistics on the session number of the initiator's IP	Statistics on the new sessions of the initiator's IP	Statistics on the URL hit count of the specified IPs	Statistics on the keyword block count of the specified IPs	Statistics on the application block count of the specified IPs
	Responder	Statistics on the traffic of the responder's IP	Statistics on the session number of the responder's IP	Statistics on the new sessions of the responder's IP			
	Belong to zone	Statistics on the traffic of an IP that belongs to a specific security zone	Statistics on the session number of an IP that belongs to a specific security zone	Statistics on the new sessions of an IP that belongs to a specific security zone			
	Not belong to zone	Statistics on the traffic of an IP that does not belong to a specific security zone	Statistics on the session number of an IP that does not belong to a specific security zone	Statistics on the new sessions of an IP that does not belong to a specific security zone			
	Belong to interface	Statistics on the traffic of an IP that belongs to a specific inter-	Statistics on the session number of an IP that belongs to a spe-	Statistics on the new sessions of an IP that belongs to a spe-			

Direction	Condition	Data type					
		Traffic	Session	Ramp-up rate	URL hit count	Keyword block count	Application block count
		face	cific interface	cific interface			
	Not belong to interface	Statistics on the traffic of an IP that does not belong to a specific interface	Statistics on the session number of an IP that does not belong to a specific interface	Statistics on the new sessions of an IP that does not belong to a specific interface			
Bi-directional	Initiator	Statistics on the inbound and outbound traffic of the initiator's IP	Statistics on the number of received and sent sessions of the initiator's IP	Statistics on the new received and sent sessions of the initiator's IP			
	Responder	Statistics on the inbound and outbound traffic of the responder's IP	Statistics on the number of received and sent sessions of the responder's IP	Statistics on the new received and sent sessions of the responder's IP			
	Belong to zone	Statistics on the inbound and outbound traffic of an IP that belongs to a specific security zone	Statistics on the number of received and sent sessions of an IP that belongs to a specific security zone	Statistics on the new received and sent sessions of an IP that belongs to a specific security zone			
	Not belong to zone	Statistics on the inbound and out-	Statistics on the number of	Statistics on the new received			

Direction	Condition	Data type					
		Traffic	Session	Ramp-up rate	URL hit count	Keyword block count	Application block count
		bound traffic of an IP that does not belong to a specific security zone	received and sent sessions of an IP that does not belong to a specific security zone	and sent sessions of an IP that does not belong to a specific security zone			
	Belong to interface	Statistics on the inbound and outbound traffic of an IP that belongs to a specific interface	Statistics on the number of received and sent sessions of an IP that belongs to a specific interface	Statistics on the new received and sent sessions of an IP that belongs to a specific interface			
	Not belong to interface	Statistics on the inbound and outbound traffic of an IP that does not belong to a specific interface	Statistics on the number of received and sent sessions of an IP that does not belong to a specific interface	Statistics on the new received and sent sessions of an IP that does not belong to a specific interface			

The interface, zone, user, application, URL, URL category, VSYS type-based statistical information table.

Group by	Direction	Data type					
		Traffic	Session	Ramp-up rate	URL hit count	Keyword block count	Application block count
Zone	No direction	Statistics on the traffic of the specified	Statistics on the session number of the specified	Statistics on the new sessions of the spe-	Statistics on the URL hit count of the spe-	N/A	N/A

Group by	Direction	Data type					
		Traffic	Session	Ramp-up rate	URL hit count	Keyword block count	Application block count
		security zones	security zones	cified security zones	cified security zones		
	Bi-directional	Statistics on the inbound and outbound traffic of the specified security zones	Statistics on the number of received and sent sessions of the specified security zones	Statistics on the new received and sent sessions of the specified security zones			
Interface	No direction	Statistics on the traffic of the specified interfaces	Statistics on the session number of the specified interfaces	Statistics on the new sessions of the specified interfaces	Statistics on the URL hit count of the specified interfaces	N/A	N/A
	Bi-directional	Statistics on the inbound and outbound traffic of the specified interfaces	Statistics on the number of received and sent sessions of the specified interfaces	Statistics on the new received and sent sessions of the specified interfaces			
Application	N/A	Statistics on the traffic of the specified applications	Statistics on the session number of the specified applications	Statistics on the new sessions of the specified applications	N/A	N/A	Statistics on the block count of the specified applications
User	No direction	Statistics on the traffic of the specified users	Statistics on the session number of the specified users	Statistics on the new sessions of the specified users	Statistics on the URL hit count of the specified users	Statistics on the keyword block count of the specified	Statistics on the application block count of the specified users

Group by	Direction	Data type					
		Traffic	Session	Ramp-up rate	URL hit count	Keyword block count	Application block count
	Bi-directional	Statistics on the inbound and outbound traffic of the specified users				users	
URL	N/A	N/A	N/A	N/A	Statistics on the hit count of the specified URLs	N/A	N/A
URL Category	N/A	N/A	N/A	N/A	Statistics on the hit count of the specified URL categories	N/A	N/A
VSYS	N/A	Statistics on the traffic of the specified VSYSs	Statistics on the session number of the specified VSYSs	Statistics on the new sessions of the specified VSYSs	Statistics on the URL hit count of the specified VSYSs	N/A	N/A

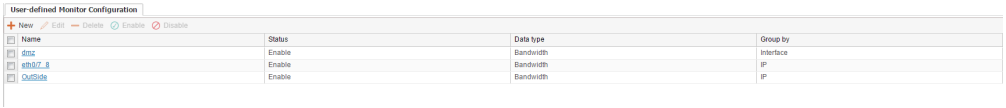
You can configure a filtering condition for the stat-set to gather statistics on the specified condition, such as statistics on the session number of the specified security zone, or the traffic of the specified IP.

The filtering conditions supported table.

Type	Description
filter zone	Data is filtered by security zone.
filter zone zone-name ingress	Data is filtered by ingress security zone.
filter zone zone-name egress	Data is filtered by egress security zone.
filter interface	Data is filtered by interface.
filter interface if-name ingress	Data is filtered by ingress interface.
filter interface if-name egress	Data is filtered by egress interface.
filter application	Data is filtered by application.
filter ip	Data is filtered by address entry.

Type	Description
filter ip add-entry source	Data is filtered by source address (address entry).
filter ip add-entry destination	Data is filtered by destination address (address entry).
filter ip A.B.C.D/M	Data is filtered by IP.
filter ip A.B.C.D/M source	Data is filtered by source IP.
filter ip A.B.C.D/M destination	Data is filtered by destination IP.
filter user	Data is filtered by user.
filter user-group	Data is filtered by user group.
filter severity	Data is filtered by signature severity.

Click **Monitor>User-defined Monitor**.

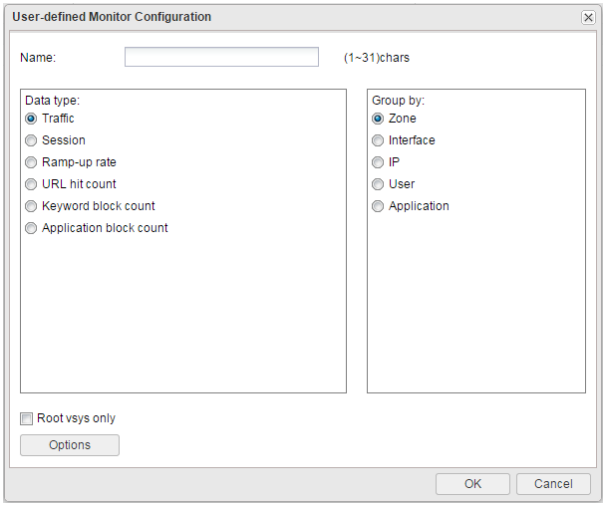


- Click **New**. For more information, see Creating_a_User-defined_Stat-set
- Click the user-defined stat-set name link. For more information, see Viewing_User-defined_Stat-set_Statistics.

Creating a User-defined Stat-set

To create a user-defined stat-set, take the following steps:

1. Click **Monitor>User-defined Monitor**.
2. Click **New**.



In the User-defined Monitor Configuration dialog box, modify according to your needs.

Option	Description
Name	Type the name for the stat-set into the Name box.
Data Type	Select an appropriate data type from the Data type list.
Group by	Select an appropriate grouping method from the Group by list.
Root vsys only	If you only want to perform the data statistics for the root VSYS, select the **Root vsys only** checkbox. This checkbox will take effect when the data

Option	Description
	type is Traffic, Session, Ramp-up rate, or URL hit. If the data grouping method is configured to VSYS, this checkbox will be unavailable.
Options	To configure a filtering condition, click Option. In the Advanced dialog box, select a filter condition from the Filter drop-down list. For more details about this option,see The_filtering_conditions_supported_table.

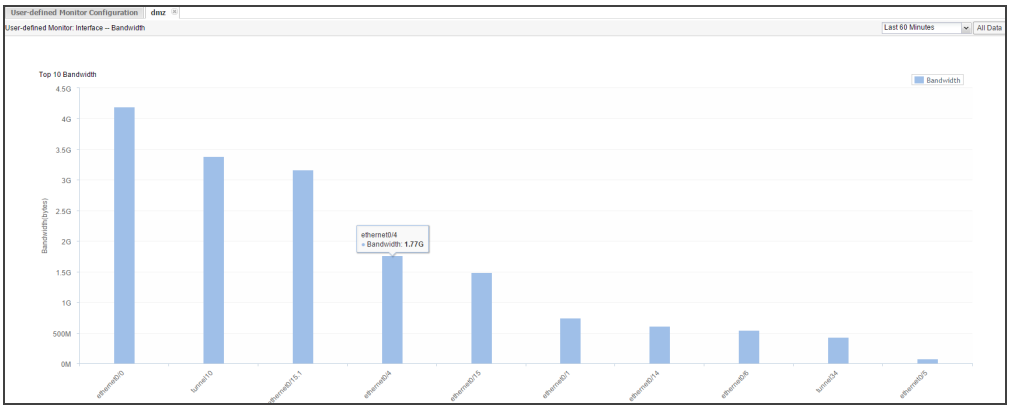
3. Click **OK** to save your settings . The configured stat-set will be displayed .

Note: You need to pay attention to the following when configure a stat-set.

- The URL hit statistics are only available to users who have a URL license.
- If the Data type is Traffic, Session, Ramp-up rate, Virus attack count, Intrusion count or URL hit count, then the Filter should not be Attack log.
- If the Data type is URL hit count, then the Filter should not be Service.
- System will hide unavailable options automatically.

Viewing User-defined Monitor Statistics

Click the user-defined stat-set name link, and then select the stat-set you want to view.

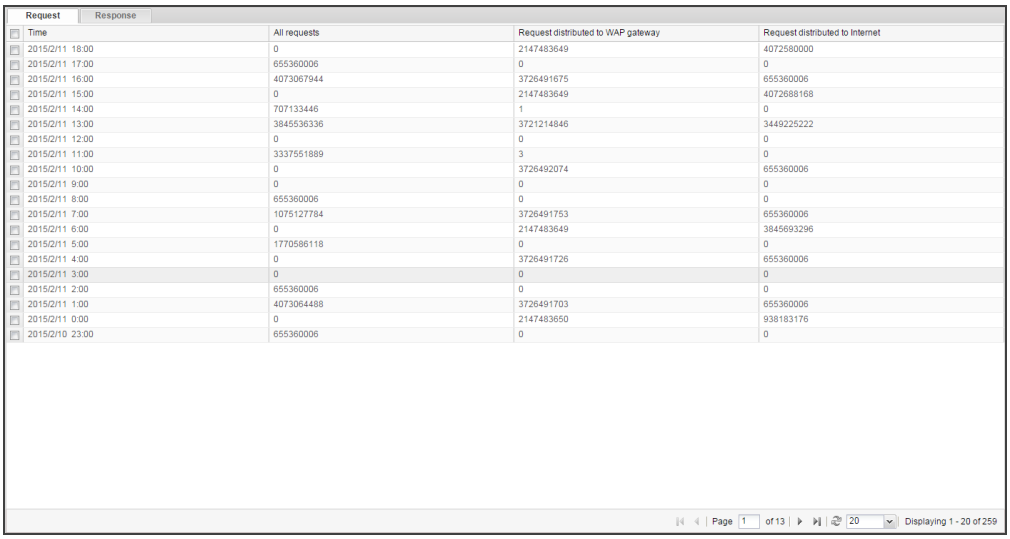


- Displays the top 10 statistical result from multiple aspects in forms of bar chart.
- View specified historic statistics by selecting a period from the statistic period drop-down list.
- Click **All Data** to view all the statistical result from multiple aspects in forms of list, trend. Click **TOP 10** returns bar chart.

WAP Traffic Distribution

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

If system is configured with a WAP traffic distribution function, this page displays the history result (in the past 24 hours and the last 30 days) of the WAP traffic distribution, including request and response.



Request | Response

Time	All requests	Request distributed to WAP gateway	Request distributed to Internet
2015/2/11 18:00	0	2147483649	4072580000
2015/2/11 17:00	655360006	0	0
2015/2/11 16:00	4073067944	3726491675	655360006
2015/2/11 15:00	0	2147483649	4072688168
2015/2/11 14:00	707133446	1	0
2015/2/11 13:00	3845536336	3721214846	3449225222
2015/2/11 12:00	0	0	0
2015/2/11 11:00	3337551889	3	0
2015/2/11 10:00	0	3726492074	655360006
2015/2/11 9:00	0	0	0
2015/2/11 8:00	655360006	0	0
2015/2/11 7:00	1075127784	3726491753	655360006
2015/2/11 6:00	0	2147483649	3845693296
2015/2/11 5:00	1770586118	0	0
2015/2/11 4:00	0	3726491726	655360006
2015/2/11 3:00	0	0	0
2015/2/11 2:00	655360006	0	0
2015/2/11 1:00	4073064488	3726491703	655360006
2015/2/11 0:00	0	2147483650	938183176
2015/2/10 23:00	655360006	0	0

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- Request: Shows the count of requests distributed to the WAP gateway/Internet and all requests.
- Response: Shows the count of successful responses from the WAP gateway/Internet and the failed responses from the WAP gateway/Internet.

Reporting

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

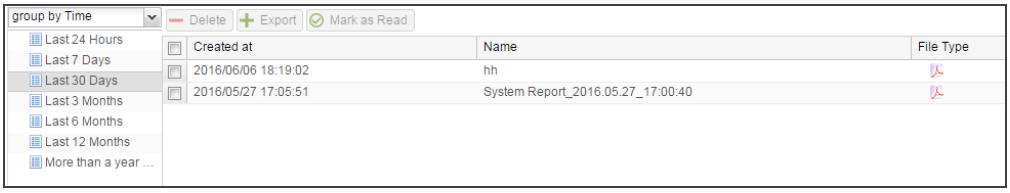
The reporting feature gathers and analyzes data for the following report categories, providing all-around and multi-dimensional statistics to you.

Report Categories	Description
Security Report	Helps users quickly understand the overall risk situation of the servers and users.
Flow Report	Analysis and display of the user, application, interface, zone's traffic and concurrency.
Content Report	Detailed description of the URL hit, including the hit times, trends, categories.

You can configure report task in "User-defined Task" on Page 421 and "Predefined Task" on Page 424, and view generated report files in "Report File" on Page 420.

Report File

Go to **Monitor > Reports > Report File** and the report file page shows all of the generated report files.



- Sort report files by different conditions: Select **Group by Time**, **Group by Task** or **Group by Status** from the drop-down list, and then select a time, task or status from the selective table, and the related report files will be shown in the report file table.
- Click **Delete** to delete the selected report files.
- Click **Export** to download the selected report files.
- Click **Mark as Read** to modify the status of the selected report files.
- Click Filter, and click + Filter to select the condition in the drop-down list. In the text box, enter the keyword to search for the report files.

> **Note:** If your browser has enabled "Blocking pop-up windows", you will not see the generated file. Make sure to set your browser "Always allow pop-up windows", or you can go to your blocked window history to find the report file.

User-defined Task

A user-defined task is a customized report task which can be tailored to meet your requirements.

Creating a User-defined Task

To create a user-defined task, take the following steps:

1. Select **Monitor > Reports > User-defined**.
2. Click **New**.

In the Report Task Configuration dialog box, configure these values.

Option	Description
Basic	
Name	Specifies the name of the report task.
Description	Specifies the description of the report task.
Report Items	
Report Items	Specifies the content for the report file. To add report items to the report task, take the following steps: 1. Expand the categories from the left list. 2. Select the category item you want, and click **Add** to add it to the right column.
Schedule	
The schedule specifies the running time of the report task. The report task can be run periodically or run immediately. Periodic: Generates report files as planned. • Schedule: Specifies the statistical period. • At: Specifies the running time. Generate Now: Generates report files immediately. • Type: Generates report file based on the data in the specified statistical period.	
Output	
File Format	The output format of the report file is a PDF.
Recipient	Sends report file via email. To add recipients, enter the email addresses in to the recipient text box (use ";" to separate multiple email addresses).
Send via FTP	Check the **Send via FTP** check box to send the report file to a specified FTP server. • Server Name/IP: Specifies the FTP server name or the IP address. • Virtual Router: Specifies the virtual router of the FTP server. • Username: Specifies the username used to log on to the FTP server. • Password: Enter the password of the FTP username. • Anonymous: Check the check box to log on to the FTP server anonymously. • Path: Specifies the location where the report file will be saved.

3. Click **OK** to complete task configuration.

Enabling/Disabling the User-defined Task

To enable or disable the user-defined task, take the following steps:

1. Select **Monitor > Reports > User-defined**.
2. Select the task you want, and click the **Enable** or **Disable** button on the top.
   By default, the user-defined task is enabled.

Viewing Report Files

To view the generated report files, select **Monitor > Reports > Report File**.

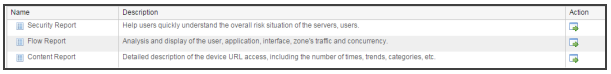
Predefined Task

The predefined tasks are the system report task template. Each report task is named according to the name of the report item, the configured date and time.

The predefined tasks include the following types:

- Security Report
- Flow Report
- Content Report

Generating Report Tasks



1. Select **Monitor > Reports > Predefined**.
2. In the **Action** column, click the icon.

In the Report Task Configuration dialog box, configure these values.

Option	Description
Basic	
Name	Specifies the name of the report task.
Description	Specifies the description of the report task. You can modify according to your requirements.
Schedule	
The schedule specifies the running time of report task. The report task can be run periodically or run immediately. Periodic: Generates report files as planned. • Schedule: Specifies the statistical period. • At: Specifies the running time. Generate Now: Generates report file immediately. • Type: Generates report files based on the data in the specified statistical period.	
Output	
File Format	The report file is outputted in PDF format.
Recipient	Sends report file via email. To add recipients, enter the email addresses in to the recipient text box (use ";" to separate multiple email addresses).
Send via FTP	Check the **Send via FTP** check box to send the report file to a specified FTP server. • Server Name/IP: Specifies the FTP server name or the IP address. • Virtual Router: Specifies the virtual router of the FTP server. • Username: Specifies the username used to log on to the FTP server. • Password: Enter the password of the FTP username. • Anonymous: Check the check box to log on to the FTP server anonymously. • Path: Specifies the location where the report file will be saved.

3. Click **OK** to complete task configuration.

Viewing Report Files

To view the generated report files, select **Monitor > Reports > Report File**.

Logging

Logging is a feature that records various kinds of system logs, including device log, threat log, session log, NAT log, Content filter log,File filter log, Network Behavior Record log and URL logs.

- Device log
  - Event - includes 8 severity levels: debugging, information, notification, warning, error, critical, alert, emergency.
  - Network - logs about network services, like PPPoE and DDNS.
  - Configuration - logs about configuration on command line interface, e.g. interface IP address setting.
- Threat - logs related to behaviors threatening the protected system, e.g. attack defense and application security.
- Session - Session logs, e.g. session protocols, source and destination IP addresses and ports.
- NAT - NAT logs, including NAT type, source and destination IP addresses and ports.
- EPP - logs related with end point protection function.
- File Filter - logs related with file filter function.
- Content filter logs – logs related with content filter function, e.g. Web content filter, Web posting, Email filter and HTTP/FTP control.
- Network behavior record logs – Logs related with network behavior record function, e.g. IM behavior ,etc.
- URL - logs about network surfing, e.g. Internet visiting time, web pages visiting history, an URL filtering logs.
- PBR - logs about policy-based route.
- CloudSandBox - logs about sandbox.

The system logs the running status of the device, thus providing information for analysis and evidence.

Log Severity

Event logs are categorized into eight severity levels.

Severity	Level	Description	Log Definition
Emergencies	0	Identifies illegitimate system events.	LOG_EMERG
Alerts	1	Identifies problems which need immediate attention such as device is being attacked.	LOG_ALERT
Critical	2	Identifies urgent problems, such as hardware failure.	LOG_CRIT
Errors	3	Generates messages for system errors.	LOG_ERR
Warnings	4	Generates messages for warning.	LOG_ WARNING
Notifications	5	Generates messages for notice and special attention.	LOG_NOTICE
Informational	6	Generates informational messages.	LOG_INFO
Debugging	7	Generates all debugging messages, including daily operation messages.	LOG_DEBUG

Destination of Exported Logs

Log messages can be sent to the following destinations:

- Console - The default output destination. You can close this destination via CLI.
- Remote - Includes Telnet and SSH.
- Buffer - Memory buffer.
- File - By default, the logs are sent to the specified USB destination in form of a file.
- Syslog Server - Sends logs to UNIX or Windows Syslog Server.
- Email - Sends logs to a specified email account.
- Local database - Sends logs to the local database of the device.

Log Format

To facilitate the access and analysis of the system logs, StoneOS logs follow a fixed pattern of information layout, i.e. **date/time, severity level@module: descriptions**.See the example below:

```
2000-02-05 01:51:21, WARNING@LOGIN: Admin user "admin" logged in through console from localhost.
```

Event Logs

This feature may vary slightly on different platforms. Please see the actual page of the feature that your device delivers.

To view event logs, select **Monitor > Log > Event**.

In this page, you can perform the following actions:

- Configuration: Click to jump to the configuration page.
- Export: Click to export the displayed logs as a TXT or CSV file.
- Filter: Click Filter to add conditions to show logs that march your filter.

Network Logs

This feature may vary slightly on different platforms. Please see the actual page of the feature that your device delivers.

To view network logs, select **Monitor > Log > Network**.

In this page, you can perform the following actions:

- Configuration: Click to jump to the configuration page.
- Export: Click to export the displayed logs as a TXT or CSV file.
- Filter: Click 

, and then click 

to add conditions to show logs that march your filter.

Configuration Logs

This feature may vary slightly on different platforms. Please see the actual page of the feature that your device delivers.

To view configuration logs, select **Monitor > Log > Configuration**.

In this page, you can perform the following actions:

- Configuration: Click to jump to the configuration page.
- Export: Click to export the displayed logs as a TXT or CSV file.
- Filter: Click 

, and then click 

to add conditions to show logs that march your filter.

Threat Logs

This feature may vary slightly on different platforms. Please see the actual page of the feature that your device delivers.

Threat logs can be generated under the conditions that:

- Threat logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- You have enabled one or more of the following features: , " Intrusion Prevention System" on Page 342, "Attack-Defense" on Page 365 or "Perimeter Traffic Filtering" on Page 374 .

To view threat logs, select **Monitor > Log > Threat**.

In this page, you can perform the following actions:

- Export: Click to export the displayed logs as a TXT or CSV file.
- Filter: Click 

, and then click 

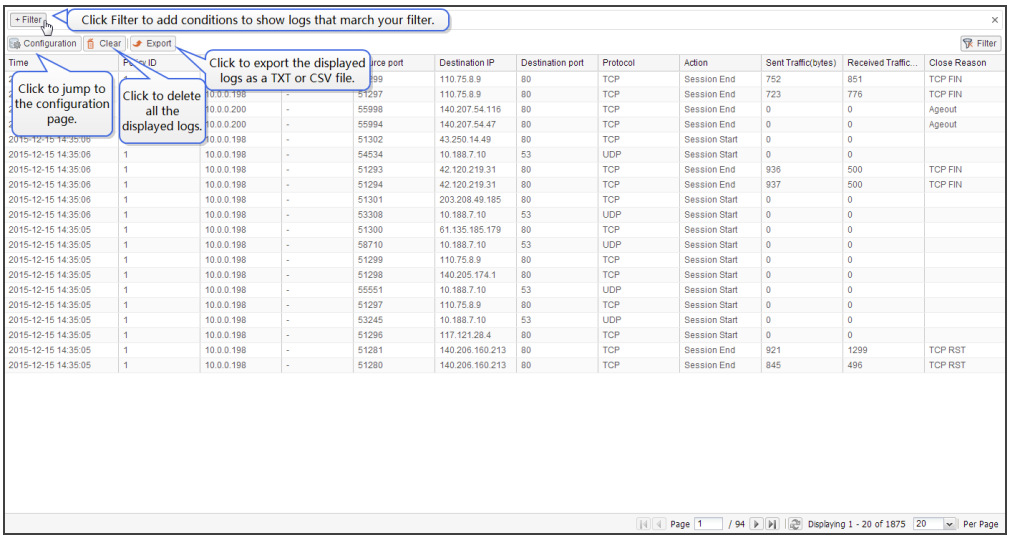
to add conditions to show logs that march your filter.You can enter the IPv4 or IPv6 address if the filter condition is selected as source or destination IP.
- View the details of selected log in the Log Details tab. In the Log Details tab, you can click "View Pcap" "Download" "Add Whitelist" "Disable Signatures" to quickly link to the relevant page.

Session Logs

Session logs can be generated under the conditions that:

- Session logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- You have enabled one or more of the following features: ."Web Content" on Page 260、"Web Posting" on Page 263、"Email Filter" on Page 266 and "Data Security" on Page 248 functions.

To view session logs, select **Monitor > Log > Session**.



Note:

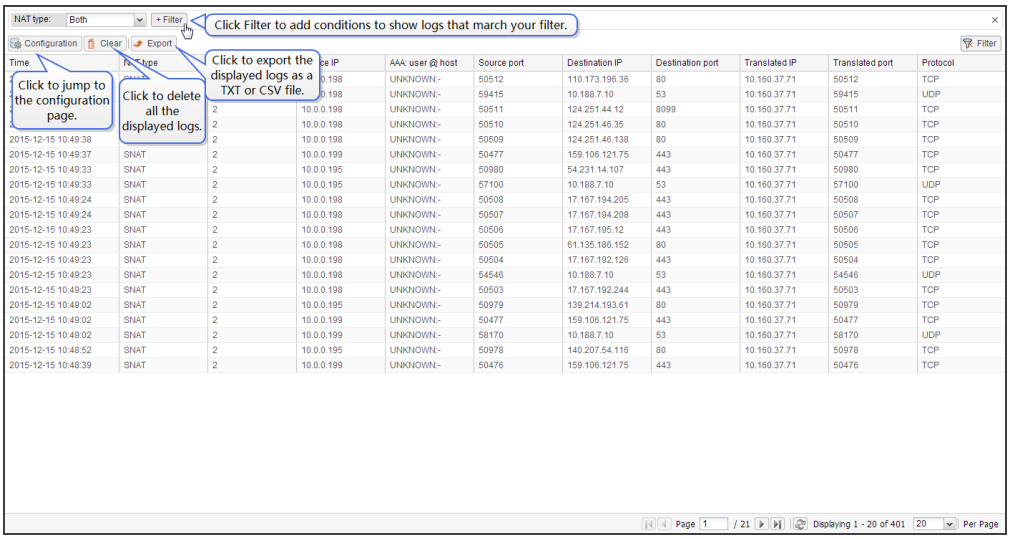
- For ICMP session logs, the system will only record the ICMP type value and its code value. As ICMP 3, 4, 5, 11 and 12 are generated by other communications, not a complete ICMP session, system will not record such kind of packets.
- For TCP and UDP session logs, system will check the packet length first. If the packet length is 20 bytes (i.e., with IP header, but no loads), it will be defined as a malformed packet and be dropped; if a packet is over 20 bytes, but it has errors, system will drop it either. So, such abnormal TCP and UDP packets will not be recorded.

NAT Logs

NAT logs are generated under the conditions that:

- NAT logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- NAT logging of the NAT rule configuration is enabled. Refer to"Configuring SNAT" on Page 305 and "Configuring SNAT" on Page 305"Configuring DNAT" on Page 310.

To view NAT logs, select **Monitor > Log> NAT**.



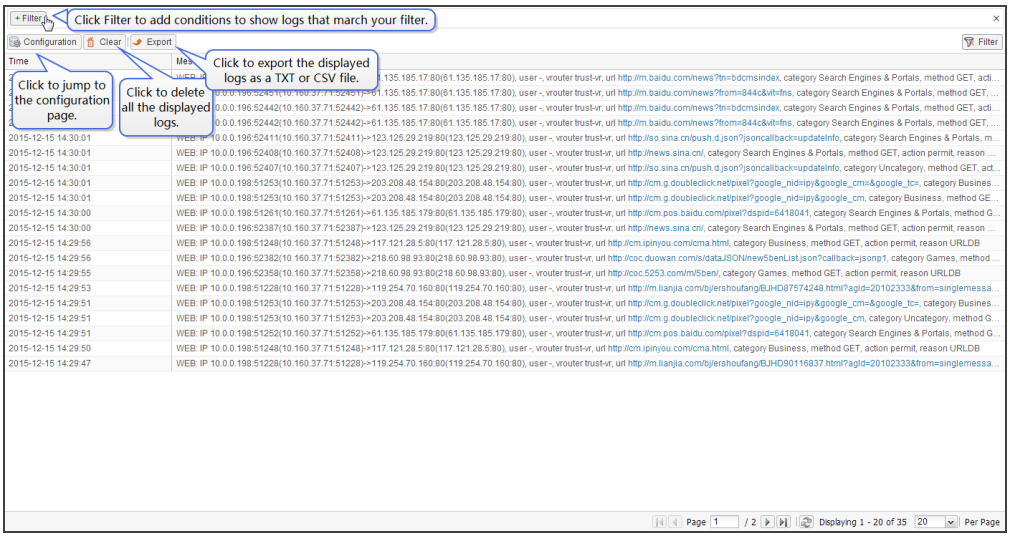
URL Logs

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

URL logs can be generated under the conditions that:

- URL logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- You have enabled logging function in URL rules. Refer to "URL Filter" on Page 237

To view threat logs, select **Monitor > Log > URL**.



EPP Logs

To view EPP logs, select **Monitor > Log > EPP**.

In this page, you can perform the following actions:

- Configuration: Click to jump to the EPP page.
- Clear: Click to clear the selected logs.
- Export: Click to export the displayed logs as a TXT or CSV file.
- Filter: Click 

, and then click 

to add conditions to show logs that march your filter.

File Filter Logs

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

File Filter logs can be generated under the conditions that:

- File Filter logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- You have enabled the function of "File Filter" on Page 257.

To view File Filter logs, select **Monitor > Log > File Filter**.

- Filter: Click Filter to add conditions to show logs that march your filter
- Configuration: Click to jump to the configuration page
- Clear: Click to delete all the displayed logs.
- Export: Click to export the displayed logs as a TXT or CSV file.

Content Filter Logs

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

Content Filter logs can be generated under the conditions that:

- Content Filter logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- You have enabled one or more of the following features: "Web Content" on Page 260, "Web Posting" on Page 263, "Email Filter" on Page 266 and"HTTP/FTP Control" on Page 269 function.

To view Content Filter logs, select **Monitor > Log > Content Filter**.

- Filter: Click Filter to add conditions to show logs that march your filter
- Configuration: Click to jump to the configuration page
- Clear: Click to delete all the displayed logs.
- Export: Click to export the displayed logs as a TXT or CSV file.

Network Behavior Record Logs

This feature may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

Network Behavior Record logs can be generated under the conditions that:

- Network Behavior Record logging in the Logging feature is enabled. Refer to "Log Configuration" on Page 439.
- You have enabled the function of"Network Behavior Record" on Page 272.

To view Network Behavior Record logs, select **Monitor > Log > Network Behavior Record**.

- Filter: Click Filter to add conditions to show logs that march your filter
- Configuration: Click to jump to the configuration page
- Clear: Click to delete all the displayed logs.
- Export: Click to export the displayed logs as a TXT or CSV file.

CloudSandBox Logs

This feature may vary slightly on different platforms. Please see the actual page of the feature that your device delivers.

To view sandbox logs, select **Monitor > Log > CloudSandBox**.

In this page, you can perform the following actions:

- Configuration: Click to jump to the CloudSandBox page.
- Clear: Click to clear the selected logs.
- Export: Click to export the displayed logs as a TXT or CSV file.
- Filter: Click 

, and then click 

to add conditions to show logs that march your filter.You can enter the IPv4 or IPv6 address if the filter condition is selected as source or destination IP.

Log Configuration

You can create log server, set up log email address, and add UNIX servers.

Creating a Log Server

To create a log server, take the following steps:

1. Select **Monitor > Log > Configuration**.
2. Click **Log Server** tab.
3. Click **New**.

In the Log Server dialog box, configure these values.

Option	Description
Host name	Enter the name or IP of the log server.
Binding	Specifies the source IP address to receive logs. • Virtual Router: Select **Virtual Router** and then select a virtual router form the drop-down list. If a virtual router is selected, the device will determine the source IP address by searching the reachable routes in the virtual router. • Source Interface: Select **Source Interface** and then select a source interface from the drop-down list. The device will use the IP address of the interface as the source IP to send logs to the syslog server. If management IP address is configured on the interface, the management IP address will be preferred.
Protocol	Specifies the protocol type of the syslog server. If "Secure-TCP" is selected, you can select **Do not validate the server certificate** option, and system can transfer logs normally and do not need any certifications.
Port	Specifies the port number of the syslog server.
Log Type	Specifies the log types the syslog server will receive.

4. Click **OK** to save the settings.

Note: You can add at most 3 log servers.

Cconfiguring Log Encoding

The default encoding format for the log information that is output to the log server is utf-8, and the user can start GBK encoding as needed. After the GBK encoding format is opened, the log encoding format that is output to the log server will be GBK encoding. To enable the GBK encoding：

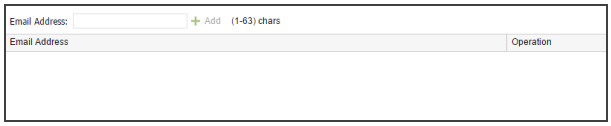
1. Select **Monitor > Log > Configuration**.
2. Click **Log Server** tab.
3. Click the **Log Encoding Config** button in the upper right corner to open the Log Encoding Config dialog box.
4. Select the check box to enable the GBK encoding.
5. .Click **OK** to save the settings.

Adding Email Address to Receive Logs

An email in the log management setting is an email address for receiving log messages.

To add an email address, take the following steps:

1. Select **Monitor > Log > Log Management**.
2. Click **Web Mail** tab.



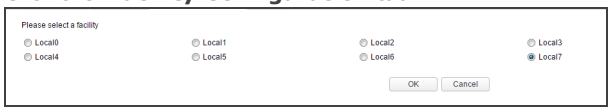
3. Enter an email address and click **Add**.
4. If you want to delete an existing email, click **Delete**.

Note: You can add at most 3 email addresses.

Specifying a Unix Server

To specify a Unix server to receive logs, take the following steps:

1. Select **Monitor > Log > Log Management**.
2. Click the **Facility Configuration** tab.



3. Select the device you want and the logs will be exported to that Unix server.
4. Click **OK**.

Specifying a Mobile Phone

To specify a mobile phone to receive logs, take the following steps:

1. Select **Monitor > Log > Log Management**.
2. Click **SMS** tab.
3. Enter a mobile phone number and click **Add**.
4. If you want to delete an existing mobile phone number, click **Delete**.

Note: You can add at most 3 mobile phone numbers.

Managing Logs

You can configure system to enable the logging function, including enabling various logs.

Configuring Logs

To configure parameters of various log types, take the following steps:

1. Select **Monitor > Log > Log Management**.
2. Click on the tab of the log type you want, and you will enter the corresponding log settings.
3. Click **OK**.

Option Descriptions of Various Log Types

This section describes the options when you set the properties of each log types.

Event Log

Option	Description
Enable	Select the check box to enable the event logging function.
Console	Select the check box to send a syslog to the Console. • Lowest severity - Specifies the lowest severity level. Logs below the severity level selected here will not be exported.
Terminal	Select the check box to send a syslog to the terminal. • Lowest severity - Specifies the lowest severity level. Logs below the severity level selected here will not be exported.
Cache	Select the check box to send a syslog to the cache. • Lowest severity - Specifies the lowest severity level. Logs below the severity level selected here will not be exported. • Max buffer size - The maximum size of the cached logs. The default value may vary for different hardware platforms.
File	Select the check box to send a syslog to a file. • Lowest severity - Specifies the lowest severity level. Logs below the severity level selected here will not be exported. • Max file size - Specifies the maximum size of the syslog file. The value range is 4096 to 1048576 bytes. The default value is 1048576 bytes.
Log server	Select the check box to export event logs to the syslog server. • View Log Server - Click to see all existing syslog servers or to add new server. • Lowest severity - Specifies the lowest severity level. Logs below the severity level selected here will not be exported.
Email address	Select the check box to send event logs to the email. • View Email Address: Click to see all existing email addresses or add a new address. • Lowest severity - Specifies the lowest severity level. Logs below the severity level selected here will not be exported.
Database	Select the checkbox to save logs in the local device. Only several platforms support this parameter.

Option	Description
	• Disk Space - Enter a number as the percentage of storage the logs will take. For example, if you enter 30, the event logs will take at most 30% of the total disk size. • Disk Space Limit - If **Auto Overwrite** is selected, the logs which exceed the disk space will overwrite the old logs automatically. If **Stop Storing** is selected, system will stop storing new logs when the logs exceed the disk space.

Network Log

Option	Description
Enable	Select the check box to enable the network logging function.
Cache	Select the check box to export network logs to the cache. • Max buffer size - The maximum size of the cached network logs. The value range is 4096 to 524288 bytes. The default value may vary for different hardware platforms.
Log server	Select the check box to export network logs to the syslog server. • View Log Server - Click to see all existing syslog servers or to add a new server.
Database	Select the checkbox to save logs in the local device. Only several platforms support this parameter. • Disk Space - Enter a number as the percentage of storage the logs will take. For example, if you enter 30, the network logs will take at most 30% of the total disk size. • Disk Space Limit - If **Auto Overwrite** is selected, the logs which exceed the disk space will overwrite the old logs automatically. If **Stop Storing** is selected, the system will stop storing new logs when the logs exceed the disk space.

Configuration Log

Option	Description
Enable	Select the check box to enable the configuration logging function.
Cache	Select the check box to export configuration logs to the cache. • Max buffer size - The maximum size of the cached configuration logs. The value range is 4096 to 524288 bytes. The default value may vary for different hardware platforms.
Log Server	Select the check box to export network logs to the syslog server. • View Log Server - Click to see all existing syslog servers or to add new server.
Database	Select the checkbox to save logs in the local device. Only several platforms support this parameter. • Disk Space - Enter a number as the percentage of storage the logs will take. For example, if you enter 30, the configuration logs will take at most 30% of the total disk size. • Disk Space Limit - If **Auto Overwrite** is selected, the logs which exceed the disk space will overwrite the old logs automatically. If **Stop Storing** is selected, the system will stop storing new logs when the logs exceed the disk space.

Option	Description
Log Generating Limitation	Select the check box to define the maximum efficiency of generating logs. • Maximum Speed - Specified the speed (messages per second).

Session Log

Option	Description
Enable	Select the check box to enable the session logging function. • Record User Name: Select to show the user's name in the session log messages. • Record Host Name: Select to show the host's name in the session log messages.
Cache	Select the check box to export session logs to cache. • Max buffer size - The maximum size of the cached session logs. The value range is 4096 to 2097152 bytes. The default value may vary for different hardware platforms.
Log Server	Select the check box to export session logs to the syslog server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - The distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.

NAT Log

Option	Description
Enable	Select the check box to enable the NAT logging function. • Record Host Name: Select to show the host's name in the NAT log messages.
Cache	Select the check box to export NAT logs to cache. • Max buffer size - The maximum size of the cached NAT logs. The default value may vary for different hardware platforms.
Log Server	Select the check box to export NAT logs to log servers. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - The distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.

URL Log

Option	Description
Enable	Select the check box to enable the URL logging function. • Record Host Name: Select to show the host's name in the URL log messages.
Cache	Select the check box to export URL logs to the cache.

Option	Description
	• Max buffer size - The maximum size of the cached URL logs. The default value may vary for different hardware platforms.
Log Server	Select the check box to export URL logs to a log server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - The distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.

File Filter Log

Option	Description
Enable	Select this check box to enable the File Filter logging function.
Cache	Select the check box to export File Filter logs to cache. • Max buffer size - The maximum size of the cached File Filter logs. The default value may vary for different hardware platforms.
Log Server	Select the check box to export File Filter logs to log server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - The distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.

Content Filter Log

Option	Description
Enable	Select this check box to enable the Content Filter logging function.
Cache	Select the check box to export Content Filter logs to cache. • Max buffer size - The maximum size of the cached Content Filter logs. The default value may vary for different hardware platforms.
Log Server	Select the check box to export Content Filter logs to log server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - The distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.

Network Behavior Record Log

Option	Description
Enable	Select this check box to enable the Network Behavior Record logging function.
Cache	Select the check box to export Network Behavior Record logs to cache. • Max buffer size - The maximum size of the cached Network Behavior Record logs. The default value may vary from different hardware platforms.

Option	Description
Log Server	Select the check box to export Network Behavior Record logs to log server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - The distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.

CloudSandBox Log

Option	Description
Enable	Select this check box to enable the CloudSandBox logging function.
Cache	Select the check box to export CloudSandBox logs to the cache. • Max buffer size - The maximum size of the cached CloudSandBox logs.
File	Select to export CloudSandBox logs as a file.
Log Server	Select the check box to export CloudSandBox logs to log server. • View Log Server - Click to see all existing syslog servers or to add a new server.

Threat Log

Option	Description
Enable	Select this check box to enable the threat logging function.
Cache	Select the check box to export threat logs to the cache. • Max buffer size - The maximum size of the cached threat logs. The default value may vary from different hardware platforms.
File	Select to export threat logs as a file to USB. • Max File Size - Exported log file maximum size.
Terminal	Select to send logs to terminals.
Log Server	Select the check box to export threat logs to log server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - the distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.
Email address	Select the check box to export logs to the specified email address. • Viewing Email Address: Click to see or add email address.
Database	Select the checkbox to save logs in the local device. Only several platforms support this parameters. • Disk Space - Enter a number as the percentage of a storage the logs will take. For example, if you enter 30, the threat logs will take at most 30% of the total disk size. • Disk Space Limit - If **Auto Overwrite** is selected, the logs which exceed the disk space will overwrite the old logs automatically. If **Stop Storing**

Option	Description
	is selected, system will stop storing new logs when the logs exceed the disk space.

EPP Log

Option	Description
Enable	Select this check box to enable the EPP logging function.
Cache	Select the check box to export EPP logs to the cache. • Max buffer size - The maximum size of the cached EPP logs. The default value may vary from different hardware platforms.
File	Select to export threat logs as a file to USB. • Max File Size - Exported log file maximum size.
Terminal	Select to send logs to terminals.
Log Server	Select the check box to export EPP logs to log server. • View Log Server - Click to see all existing syslog servers or to add a new server. • Syslog Distribution Methods - the distributed logs can be in the format of binary or text. If you select the check box, you will send log messages to different log servers, which will relieve the pressure of a single log server. The algorithm can be Round Robin or Src IP Hash.
Email address	Select the check box to export logs to the specified email address. • Viewing Email Address: Click to see or add email address.

Chapter 11 Diagnostic Tool

This feature may not be available on all platforms. Please check your system's actual page if your device delivers this feature.

System supports the following diagnostic methods:

- Test Tools: DNS Query, Ping and Traceroute can be used when troubleshooting the network.

Test Tools

DNS Query, Ping and Traceroute can be used when troubleshooting the network.

DNS Query

To check the DNS working status of the device, take the following steps:

1. Select **System** > **Diagnostic Tool** > **Test Tools**.
2. Type a domain name into the **DNS Query** box.
3. Click **Test**, and the testing result will be displayed in the list below.

Ping

To check the network connecting status, take the following steps:

1. Select **System** > **Diagnostic Tool** > **Test Tools**.
2. Type an IP address into the **Ping** box.
3. Click **Test**, and the testing result will be displayed in the list below.
4. The testing result contains two parts:
   - The Ping packet response. If there is no response from the target after timeout, it will print Destination Host Not Response, etc. Otherwise, the response contains sequence of packet, TTL and the response time.
   - Overall statistics, including number of packet sent, number of packet received, percentage of no response, the minimum, average and maximum response time.

Traceroute

Traceroute is used to test and record gateways the packet has traversed from the originating host to the destination. It is mainly used to check whether the network connection is reachable, and analyze the broken point of the network. The common Traceroute function is performed as follows: first, send a packet with TTL 1, so the first hop sends back an ICMP error message to indicate that this packet can not be sent (because of the TTL timeout); then this packet is re-sent, with TTL 2, TTL timeout is sent back again; repeat this process till the packet reaches the destination. In this way, each ICMP TTL timeout source address is recorded. As the result, the path from the originating host to the destination is identified.

To test and record gateways the packet has traversed by Traceroute, take the following steps:

1. Select **System** > **Diagnostic Tool** > **Test Tools**.
2. Type an IP address into the **Traceroute** box.
3. Click **Test**, and the testing result will be displayed in the list below.

Chapter 12 High Availability

HA, the abbreviation for High Availability, provides a fail-over solution for communications lines or device failure to ensure the smooth communication and effectively improve the reliability of the network. To implement the HA function, you need to configure the two devices as HA clusters, using the identical hardware platform and firmware version, both enabling Virtual Router and AV functions, with anti-virus license installed. When one device is not available or can not handle the request from the client properly, the request will be promptly directed to the other device that works normally, thus ensuring uninterrupted network communication and greatly improving the reliability of communications.

System supports three HA modes: Active-Passive (A/P), Active-Active (A/A), and Peer.

- Active-Passive (A/P) mode: In the HA cluster, configure two devices to form an HA group, with one device acting as a primary device and the other acting as its backup device. The primary device is active, forwarding packets, and meanwhile synchronizes all of its network and configuration information and current session information to the backup device. When the primary device fails, the backup device will be promoted to primary and takes over its work to forward packets. This A/P mode is redundant, and features a simple network structure for you to maintain and manage.
- Active-Active (A/A) mode: When the security device is in NAT mode, routing mode or a combination of both, you can configure two Hillstone devices in the HA cluster as active, so that the two devices are running their own tasks simultaneously, and monitoring the operation status of each other. When one device fails, the other will take over the work of the failure device and also run its own tasks simultaneously to ensure uninterrupted work. This mode is known as the Active-Active mode. The A/A mode has the advantage of high-performance, as well as load-balancing.
- Peer mode: the Peer mode is a special HA Active-Active mode. In the Peer mode, two devices are both active, perform their own tasks simultaneously, and monitor the operation status of each other. When one device fails, the other will take over the work of the failure device and also run its own tasks simultaneously. In the Peer mode, only the device at the active status can send/receive packets. The device at the disabled status can make two devices have the same configuration information but its interfaces do not send/receive any packets. The Peer mode is more flexible and is suitable for the deployment in the asymmetric routing environment.

HA Active-Active (A/A) and Peer mode may not be available on all platforms. Please check your system's actual page to see if your device delivers this feature.

Basic Concepts

HA Cluster

For the external network devices, an HA cluster is a single device which handles network traffic and provides security services. The HA cluster is identified by its cluster ID. After specifying an HA cluster ID for the device, the device will be in the HA state to implement HA function.

HA Group

System will select the primary and backup device of the same HA group ID in an HA cluster according to the HCMP protocol and the HA configuration. The primary device is in the active state and processes network traffic. When the primary device fails, the backup device will take over its work.

When assigning a cluster ID to the device, the HA group with ID 0 will be automatically created. In Active-Passive (A/P) mode, the device only has HA group 0. In Active-Active (A/A) mode, the latest Hillstone version supports two HA groups, i.e., Group 0 and Group 1.

HA Node

To distinguish the HA devices in an HA group, you can use the value of HA Node to mark the devices. StoneOS support the values of 0 and 1.

In the HA Peer mode, the system can decide which device is the master according to the HA Node value. In the HA group 0, the device whose HA Node value is 0 will be active and the device whose HA Node value is 1 is at the disabled status. In the HA group 1, this does not make sense because both times is HA Node value of 0

Virtual Forward Interface and MAC

In the HA environment, each HA group has an interface to forward traffic, which is known as the Virtual Forward Interface. The primary device of each HA group manages a virtual MAC (VMAC) address which is corresponding with its interface, and the traffic is forwarded on the interface. Different HA groups in an HA cluster cannot forward data among each other. VMAC address is defined by HA base MAC, HA cluster ID, HA group ID and the physical interface index.

HA Selection

In an HA cluster, if the group ID of the HA devices is the same, the one with higher priority will be selected as the primary device.

HA Synchronization

To ensure the backup device can take over the work of the primary device when it fails, the primary device will synchronize its information with the backup device. There are three types of information that can be synchronized: configuration information, files and RDO (Runtime Dynamic Object). The specific content of RDO includes:

- Session information (The following types of session information will not be synchronized: the session to the device itself, tunnel session, deny session, ICMP session, and the tentative session)
- IPsec VPN information
- SCVPN information
- DNS cache mappings
- ARP table
- PKI information
- DHCP information
- MAC table
- WebAuth information

System supports two methods to synchronize: real-time synchronization and batch synchronization. When the primary device has just been selected successfully, the batch synchronization will be used to synchronize all information of the primary device to the backup device. When the configurations change, the real-time synchronization will be used to synchronize the changed information to the backup device. Except for the HA related configurations and local configurations (for example, the host name), all the other configurations will be synchronized.

Configuring HA

This feature may vary slightly on different platforms, if there is a conflict between this guide and the actual page, the latter shall prevail.

To configure the HA function, take the following steps:

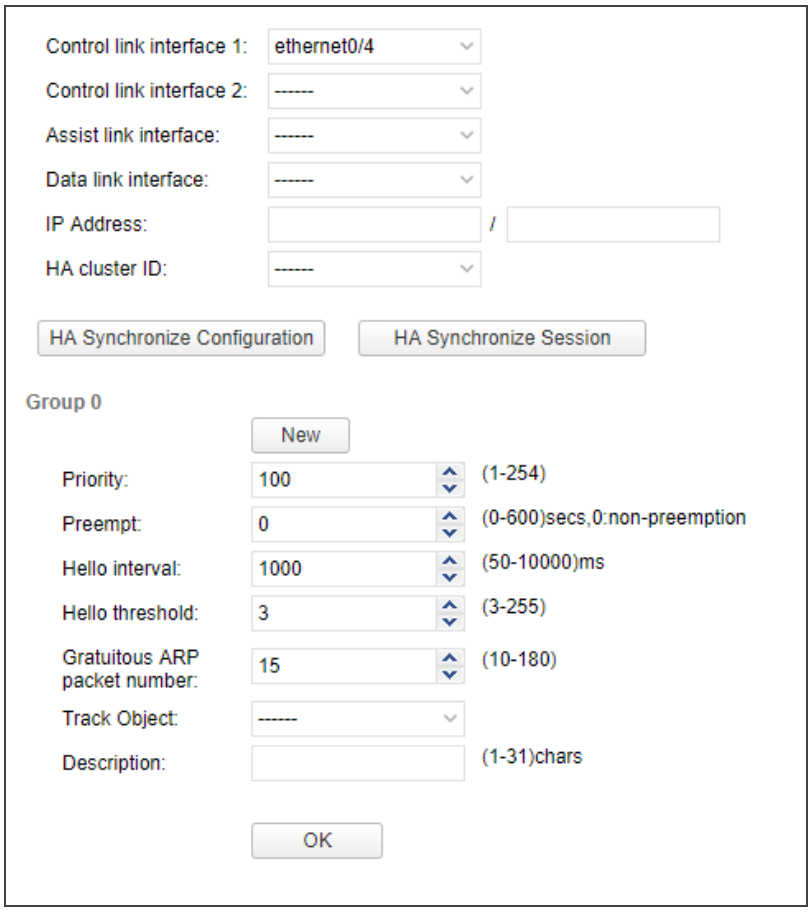
1. Configure an HA Virtual Forward Interface. For more information on configuring the interface, see "Configuring an Interface" on Page 12.
2. Configure an HA link interface which is used for the device synchronization and HA packets transmission.

   - Configure an HA cluster. Specify the HA VMAC prefix(optional) and ID of HA cluster to enable the HA function.
   - Configure an HA group. Specify the priority for devices and HA messages parameters.
3. Configure an HA cluster. Specify the HA VMAC prefix(optional) and ID of HA cluster to enable the HA function.
4. Configure an HA group. Specify the priority for devices and HA messages parameters.

You need to configure the HA data link interface when configuring the HA function, and make sure the HA group interface 0 and interface 1 can be configured as an HA control link interface, but not an HA data link interface.

To configure HA, take the following steps:

1. Go to **System > HA**.



Option	Description
Control link interface 1	Specifies the name of the HA control link interface. The control link interface is used to synchronize all data between two devices.
Control link interface 2	Specifies the name of HA control link interface (Backup device).
Assist link interface	Specifies the name of the HA assist link interface. In the Active-Passive (A/P) mode, you can specify the HA assist link interface to receive and send heartbeat packets (Hello packets), and ensure the main and backup device of HA switches normally when the HA link fails. **Note**: • Before the HA link is restored, the HA assist link interface can only receive and send heartbeat packets and the data packets cannot be synchronized. You are advised not to modify the current configurations. After the HA link is restored, manually synchronize session information. • The HA assist link interface must use an interface other than the HA link interface and be bound to the zone. • You need to specify the same interface as the HA assist link interface for the main and backup device, and ensure that the interface of the main and backup device belongs to the same VLAN.
Data link interface	Specifies the name of the HA data link interface. The data link interface is used to synchronize the data packet information. After specifying this data link, the session information will be synchronized over this data link. You can configure the physical interface or aggregate interface as the interface of the data link and you can specify at most 1 HA data link interface.
IP address	Specifies the IP address and netmask of the HA link interface.
HA VMAC prefix	Specifies the prefix of the HA base MAC in hexadecimal format. Its length can only be configured as seven or eight. If more than 8 HA clusters in a network segment need to be configured, you can configure the prefix of the HA virtual base MAC address, i.e., the HA virtual MAC prefix, in order to avoid the HA virtual MAC address duplication. By default, the HA virtual MAC prefix is 0x001C54FF. It should be noted that 0x00000000, 0x0000000, 0xFFFFFFFF, 0xFFFFFFF or multicast addresses (i.e., the second hexadecimal number is odd) are invalid. After the configuration is complete, the configuration will take effect after reboot. **Note**: With the HA function enabled, if you want to modify the HA virtual MAC prefix, you may need to disable the HA function first.
HA cluster ID	Specifies an ID for HA cluster. When the length of prefix is set to 7 hexadecimal, the ID ranges from 1~128. When the length of prefix is set to 8 or by default, the ID ranges from 1~8. None indicates to disable the HA function.
Node ID	After enabling the HA function, specify the Node ID (HA Node) for the device. The IDs for two devices must be different. The range is 0 to 1. If you do not specify this value, the devices will obtain the Node ID by automatic negotiation.
Peer-mode	Selects the **Enable** checkbox to enable the HA Peer mode and specifies the role of this device in the HA cluster. The range is 0 to 1. By default, the group 0 in the device whose HA Node ID is 0 will be active and the group 0 in the device whose HA Node ID is will be in the disabled status.
Symmetric-rout-	Select Symmetric-routing to make the device work in the symmetrical

Option	Description
ing	routing environment.
HA Synchronize Configuration	In some exceptional circumstances, the master and backup configurations may not be synchronized. In such a case you need to manually synchronize the configuration information of the master and backup device. Click **HA Synchronize Configuration** to synchronize the configuration information of the master and backup device.
HA Synchronize Session	By default the system will synchronize sessions between HA devices automatically. Session synchronization will generate some traffic, and will possibly impact device performance when the device is overloaded. You can enable automatic HA session synchronization according to the device workload to assure stability. Click **HA Synchronize Session** to enable automatic HA session synchronization.
New	After specifying the HA cluster ID, the system will create the HA group 0 automatically. Click New to create the HA group 1.
Delete	Click **Delete** to remove HA group 1 if needed.
Priority	Specifies the priority for the device. The device with higher priority (smaller number) will be selected as the primary device.
Preempt	Configure the preempt mode. When the preempt mode is enabled, once the backup device finds that its own priority is higher than the primary device, it will upgrade itself to become the primary device and the original primary device will become the backup device. The value of 0 indicates to disable the preempt mode. When the preempt mode is disabled, even if the device's priority is higher than the primary device, it will not take over the primary device unless the primary device fails.
Hello interval	Specifies the Hello interval value. The Hello interval refers to the interval for the HA device to send heartbeats (Hello packets) to other devices in the HA group. The Hello interval in the same HA group must be identical.
Hello threshold	Specifies the threshold value of the Hello message. If the device does not receive the specified number of Hello messages from the other device, it will suppose the other device's heartbeat stops.
Gratuitous ARP packet number	Specifies the number of gratuitous ARP packets. When the backup device is selected as the primary device, it will send an ARP request packet to the network to inform the relevant network devices to update its ARP table.
Track object	Specifies the track object you have configured. The track object is used to monitor the working status of the device. Once finding the device stop working normally, system will take the corresponding action.
Description	Type the descriptions of HA group into the box.

2. Click **OK**.

Chapter 13 System Management

The device's maintenance and management include:

System Information

Users can view the general information of the system in the System Information page, including Serial Number, Hostname, Platform, System Time, System Uptime, Firmware, Signature Database and so on.

Viewing System Information

To view system information, select **System** > **System Information**.

Option	Description
Serial Number	Show the serial number of device.
Hostname	Show the name of device.
Platform	Show the platform model of device.
System Time	Show the system date and time of device.
System Uptime	Show the system uptime of device.
HA State	Show the HA status of device. • Standalone: Non-HA mode that represents HA is disabled. • Init: Initial state. • Hello: Negotiation state that represents the device is consulting the relationship between the master and backup. • Master: Master state that represents the current device is the master. • Backup: Backup state that represents the current device is the backup. • Failed: Fault state that represents the device has failed.
Firmware	Show the current firmware version of the device.
Application Signature	Show the current version of the application signature database and the date of the last update.
Advanced Threat Detection Signature	Show the current version of the advanced threat detection signature database and the date of the last update.
Abnormal Behavior Detection Signature	Show the current version of the abnormal behavior detection signature database and the date of the last update.
URL Signature	Show the current version of the URL signature database and the date of the last update.
Perimeter Traffic Filtering Signature	Show the current version of the perimeter traffic filtering signature database and the date of the last update.
Antivirus Signature	Show the current version of the antivirus signature database and the date of the last update.
IPS Signature	Show the current version of the IPS signature database and the date of the last update.
Mitigation Signature	Show the current version of the mitigation signature database and the date of the last update.
Botnet C&C Prevention Signature	Show the current version of the Botnet C&C Prevention signature database and the date of the last update.

Note: The signature is all license controlled, so you need to make sure that your system has installed that license. Refer to "CloudEdge License" on Page 477.

Device Management

Introduces how to configure the Administrator, Trust Host, MGT Interface, System Time, NTP Key and system options.

Administrators

Device administrators of different roles have different privileges. The system supports pre-defined administrator roles and customized administrator roles. By default, the system supports the following administrators, which cannot be deleted or edited:

- **admin**: Permission for reading, executing and writing. This role has the authority over all features. You can view the current or historical configuration information.
- **admin-read-only**: Permission for reading and executing. You can view the current or historical configuration information.
- **operator**: Permission for reading, executing and writing. You have the authority over all features except modify the Administrator's configuration, view the current or historical configuration information , but no permission to check the log information.
- **auditor**: You can only operate on the log information, including view, export and clear.

The following table shows the permissions to different types of administrators.

Operation	Administratior	Administratior (read-only)	Auditor	Operator
Configure (including saving configuration)	√	X	X	√
Configure administrator	√	X	X	X
Restore factory default	√	X	X	X
Delete configuration file	√	X	X	√
Roll back configuration	√	X	X	√
Reboot	√	X	X	X
View configuration information	√	√	X	√
View log information	√	√	√	X
Modify current admin password	√	√	X	√
ping/traceroute	√	√	X	√

Note:

- The device ships with a default administrator named hillstone. You can modify the setting of hillstone. However, this account cannot be deleted.
- Other administrator roles (except default administrator) cannot configure the admin settings, except modifying its own password.
- The system auditor can manage one or more logs, but only the system administrator can manage the log types.

VSYS Administrator

Administrators in different VSYSs are independent from each other. Administrators in the root VSYS are known as root administrators and administrators in the non-root VSYS are known as non-root administrators. The system supports four types of administrator, including Administrators, Administrator(read-only), Operator, and Auditor.

When creating VSYS administrators, you must follow the rules listed below:

- Backslash (\) cannot be used in administrator names.
- The non-root administrators are created by root administrators or root operators after logging into the non-root VSYS.
- After logging into the root VSYS, the root administrators can switch to the non-root VSYS and configure it.
- Non-root administrators can enter the corresponding non-root VSYS after a successful login, but the non-root administrators cannot switch to the root VSYS.
- Each administrator name should be unique in the VSYS it belongs to, while administrator names can be the same in different VSYSs. In such a case, when logging in, you must specify the VSYS the administrator belongs to in form of vsys_name\admin_name. If no VSYS is specified, you will enter the root VSYS.

The following table shows the permissions to different types of VSYS administrators.

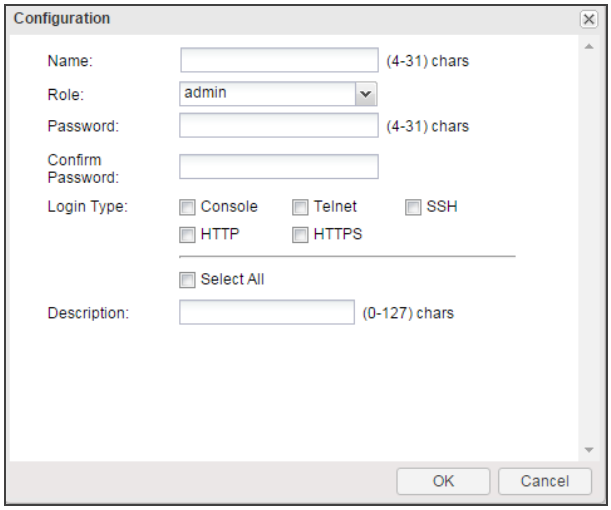
Operation	Root VSYS Administratior	Root VSYS Administratior (read-only)	Root VSYS Auditor	Root VSYS Operator	Non-root VSYS Administratior	Non-root VSYS Administratior (read-only)	Non-root VSYS Operator	Non-root VSYS Auditor
Configure (including saving configuration)	√	X	X	√	√	X	√	X
Configure administrator	√	X	X	X	√	X	X	X
Restore factory default	√	X	X	X	X	X	X	X
Delete configuration file	√	X	X	√	√	X	√	X
Roll back configuration	√	X	X	√	√	X	√	X
Reboot	√	X	X	X	X	X	X	X
View configuration information	√	√	X	√	View information in current VSYS	View information in current VSYS	View information in current VSYS	X
View log information	√	√	√	X	√	√	X	√
Modify current admin password	√	√	√	√	√	√	√	√
ping/tracerout	√	√	X	√	√	√	√	X

Creating an Administrator Account

To create an administrator account, take the following steps:

1. Select **System** > **Device Management** > **Administrators**.
2. Click **New**.

3. In the Configuration dialog box, configure the following.



Configure the following options.

Option	Description
Name	Type a name for the system administrator account.
Role	From the **Role** drop-down list, select a role for the administrator account. Different roles have different privileges. • Admin: Permission for reading, executing and writing. This role has the authority over all features. • Operator: YThis role has the authority over all features except modifying the Administrator's configurations, and has no permission to check the log information • Auditor: You can only operate on the log information, including the view, export and clear. • Admin-read-only: Permission for reading and executing. You can view the current or historical configuration information.
Password	Type a login password for the admin into the **Password** box. The password should meet the requirements of Password Strategy.
Confirm Password	Re-type the password into the **Confirm Password** box.
Login Type	Select the access method(s) for the admin, including Console, Telnet, SSH, HTTP and HTTPS. If you need all access methods, select **Select All**.
Description	Enter descriptions for the administrator account.

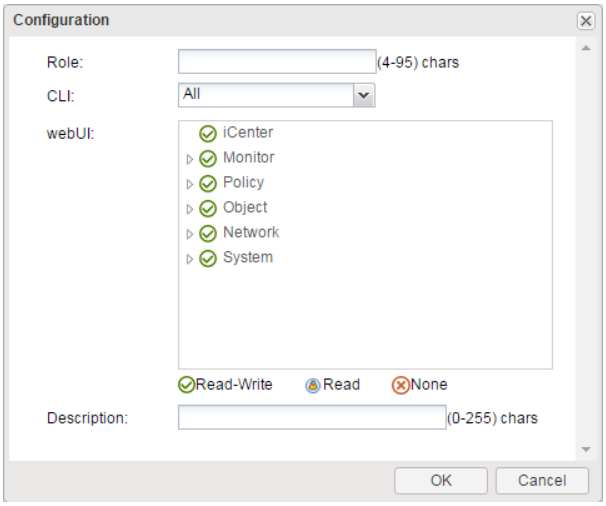
4. Click **OK**.

Admin Roles

Device administrators of different roles have different privileges. The system supports pre-defined administrator roles and customized administrator roles. The pre-defined administrator role cannot be deleted or edited. You can customize administrator roles according to your requirements:

To create a new administrator role, take the following steps:

1. Select **System > Device Management > Admin Roles**.
2. Click **New**.



3. **In the Configuration dialog box, configure the following:**

Option	Description
Role	Enter the role name.
CLI	Specify the administrator role's privileges of CLI.
WebUI	Click module name to set the administrator role's privilege. represents the administrator role does not have privilege of the specified module, and cannot read and edit the configurations of the specified module. represents the administrator role has the read privilege of the specified module, and cannot edit the configurations. represents the administrator role can read and edit the configurations of the specified module.
Description	Specify the description for this administrator role.

4. Click **OK** to save the settings.

Trust Host

The device only allows the trust host to manage the system to enhance the security. Administrator can specify an IP range, and hosts in the specified IP range are trust hosts. Only trust hosts could access the management interface to manage the device.

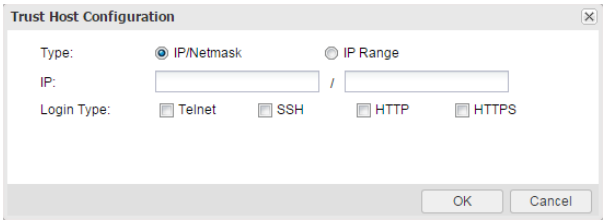
Note: If the system cannot be managed remotely, check the trust host configuration.

Creating a Trust Host

To create a trust host, take the following steps:

1. Select **System** > **Device Management** > **Trust Host**.
2. Click **New**.

3. In the Trust Host Configuration dialog box, configure these values.



Configure the following options.

Option	Description
Type	Specifies the type of host. You can select **IP/Netmask** or **IP Range**. • IP/Netmask: Type the IP address and netmask into the **IP** box respectively. • IP Range: Type the start IP and end IP into the **IP** box respectively.
Login Type	Select the access methods for the trust host, including Telnet, SSH, HTTP and HTTPS.

4. Click **OK**.

Management Interface

The device supports the following access methods: Console, Telnet, SSH and WebUI. You can configure the timeout value, port number, PKI trust domain of HTTPS,and PKI trust domain of certificate authentication. When accessing the device through Telnet, SSH, HTTP or HTTPS, if login fails three times in one minute, the IP address that attempts the login will be blocked for 2 minutes during which the IP address cannot connect to the device.

To configure the access methods:

1. Select **System** > **Device Management** > **Management Interface**.
2. In the Management Interface tab, configure these values.

Configure the following options.

Option	Description
Console	Configure the Console access method parameters. • Timeout: Type the Console timeout value into the **Timeout** box. The value range is 0 to 60. The default value is 10. The value of 0 indicates never timeout. If there is no activity until the timeout, system will drop the console connection.
Telnet	Configure the Telnet access method parameters. • Timeout: Specifies the Telnet timeout value. The value range is 1 to 60. The default value is 10. • Port: Specifies the Telnet port number. The value range is 1 to 65535. The default value is 23.
SSH	Configure the SSH access method parameters. • Timeout: Specifies the SSH timeout value. The value range is 1 to 60. The default value is 10. • Port: Specifies the SSH port number. The value range is 1 to 65535. The default value is 22.

Option	Description
Web	Configure the WebUI access method parameters. • Timeout: Specifies the WebUI timeout value. The value range is 1 to 1440. The default value is 10. • HTTP Port: Specifies the HTTP port number. The value range is 1 to 65535. The default value is 80. • HTTPS Port: Specifies the HTTPS port number. The value range is 1 to 65535. The default value is 443. • HTTPS Trust Domain: Select the trust domain existing in the system from the drop-down list. When HTTPS starts, HTTPS server will use the certificate with the specified trusted domain. By default, the trust domain trust_domain_default will be used. • Certificate Authentication: With this checkbox selected, system will start the certificat authentication. The certificate includes the digital certificate of users and secondary CA certificate signed by the root CA.Certificate authentication is one of two-factor authentication. The two-factor authentication does not only need the user's name and password authentication, but also needs other authentication methods, like a certificate or fingerprint. • Binding Trust Domain: After enabling the certificate authentication and logging into the device over HTTPS, HTTPS server will use the certificate with the specified trusted domain.Make sure that root CA certificate is imported into it. • CN Check：After the CN check is enabled, the name of the root CA certificate is checked and verified when the user logs in. Only the certificate and the user can be consistent, and the login succeeds.

3. Click **OK**.

Note: When changing HTTP port, HTTPS port or HTTPS Trust Domain, the web server will restart. You may need to log in again if you are using the Web interface.

System Time

You can configure the current system time manually, or synchronize the system time with the NTP server time via NTP protocol.

Configuring the System Time Manually

To configure the system time manually, take the following steps:

1. Select **System** > **Device Management** > **System Time**.
2. Under System Time Configuration in the System Time tab, configure the following.

Option	Description
Sync with Local PC	Specifies the method of synchronize with local PC. You can select **Sync Time** or **Sync Zone&Time**. • Sync Time: Synchronize the system time with local PC.

Option	Description
	• Sync Zone&Time: Synchronize the system zone&time with local PC.
Specified the system time.	Configure parameter of system time. • Time Zone: Select the time zone from the drop-down list. • Date: Specifies the date. • Time: Specifies the time.

3. Click **OK**.

Configuring NTP

The system time may affect the establishment time of VPN tunnel and the schedule, so the accuracy of the system time is very important. To ensure the system is able to maintain an accurate time, the device allows you to synchronize the system time with a NTP server on the network via NTP protocol.

To configure NTP:

1. Select **System** > **Device Management** > **System Time**.

2. Under NTP Configuration in the System Time tab, configure the following.

Option	Description
Enable	Select the **Enable** check box to enable the NTP function. By default, the NTP function is disabled.
Authentication	Select the **Authentication** check box to enable the NTP Authentication function.
Server	Specifies the NTP server that device need to synchronize with. You can specify at most 3 servers. • IP: Type IP address of the server . • Key: Select a key from the **Key** drop-down list. If you enable the NTP Authentication function, you must specify a key. • Virtual Router: Select the Virtual Router of interface for NTP communication from the drop-down list. • Source interface: Select an interface for sending and receiving NTP packets. • Specify as a preferred server: Click **Specify as a preferred server** to set the server as the first preferred server. The system will synchronizate with the first preferred server.
Sync Interval	Type the interval value. The device will synchronize the system time with the NTP server at the interval you specified to ensure the system time is accurate.
Maximum Adjustment	Type the time value. If the time difference between the system time and the NTP server's time is within the max adjustment value you specified, the synchronization will succeed, otherwise it will fail.

3. Click **OK**.

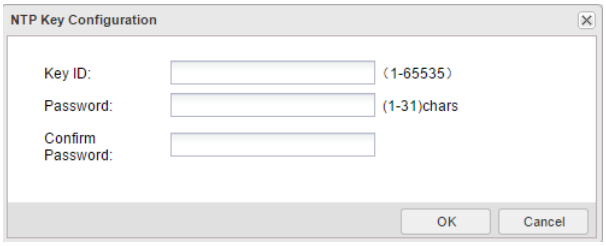
NTP Key

After enabling NTP Authentication function, you need to configure MD5 key ID and keys. The device will only synchronize with the authorized servers.

Creating a NTP Key

To create an NTP key:

1. Select **System** > **Device Management** > **NTP Key**.
2. Click **NEW**.
3. In the NTP Key Configuration dialog box, configure these values.



Configure the following options.

Option	Description
Key ID	Type the ID number into the Key ID box. The value range is 1 to 65535.
Password	Type a MD5 key into the **Password** box. The value range is 1 to 31.
Confirm Password	Re-type the same MD5 key you have entered into the **Confirm** box.

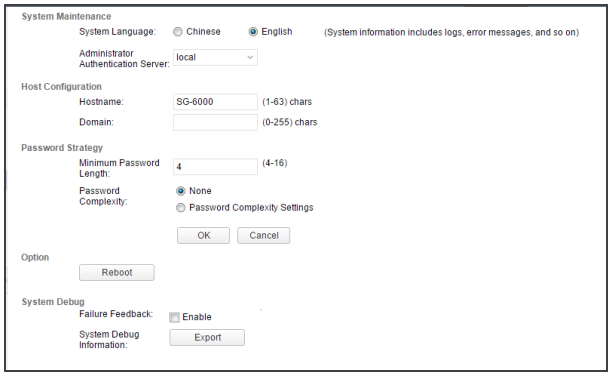
4. Click **OK**.

Option

Specifies system options, including system language, administrator authentication server, host name, password strategy, reboot and exporting the system debugging information.

To change system option, take the following steps:

1. Select **System** > **Device Management** > **Option**
2. Configure the following.



Option	Description
System Maintenance	Configure the system language and administrator authentication server. • System Language: You can select **Chinese** or **English** according to your own requirements. • Administrator Authentication Server: Select a server to authenticate the administrator from the drop-down list.
Host Configuration	In some situation, more than one devices are installed within a network. To distinguish among these devices, different names should be assigned to different devices. The default host name is assigned according to the model. • Hostname: Type a host name you want to change into the **Hostname** box. • Domain: Type a domain name you want to specify into the **Domain** box.

Password Strategy	Configure password complexity for admin user.
	• Minimum Password Length: Specifies the minimum length of password. The value range is 4 to 16 characters. The default value is 4.
	• Password Complexity: Unlimited means no restriction on the selection of password characters.You can select Set Password Complexity to enable password complexity checking and configure password complexity.
	  • Capital letters length：The default value is 2 and the range is 0 to 16.
	  • Small letters length：The default value is 2 and the range is 0 to 16.
	  • Number letters length：The default value is 2 and the range is 0 to 16.
	  • Special letters Length：The default value is 2 and the range is 0 to 16.
	  • Validity Period：The unit is day.The range is 0 to 365.The default value is 0, which indicates that there is no restriction on validity period of the password.

3. Click **OK**.

Rebooting the System

Some operations like license installation or image upgrading will require the system to reboot before it can take effect.

To reboot a system, take the following steps:

1. Go to **System > Device Management > Option** .
2. Click **Reboot**, and select **Yes** in the prompt.
3. The system will reboot. You need to wait a while before it can start again.

System Debug

System debug is supported for you to check and analyze the problems.

Failure Feedback

To enable the failure feedback function, take the following steps:

1. Select **System > Device Management> Option**.
2. In the System Tools dialog box, select the **Enable** check box for Failure feedback, and then system will automatically send the technical support file to the manufacturer.

System Debug Information

System debugging helps you to diagnose and identify system errors by the exported file.

To export the system debugging information, take the following steps:

1. Select **System > Device Management> Option**.
2. Click **Export**, system will pack the file in /etc/local/core and prompt to save tech-support file. After selecting the saved location and click **OK**, you can export the file successfully.

Configuration File Management

System configuration information is stored in the configuration file, and it is stored and displayed in the format of command line. The information that is used to initialize the Hillstone device in the configuration file is known as the initial configuration information. If the initial configuration information is not found, the Hillstone device will use the default parameters for the initialization. The information being taking effect is known as the current configuration information.

System initial configuration information includes current initial configuration information (used when the system starts) and backup initial configuration information. System records the latest ten saved configuration information, and the most recently saved configuration information for the system will be recorded as the current initial configuration information. The current configuration information is marked as Startup; the previous nine configuration information is marked with number from 0 to 8, in the order of save time.

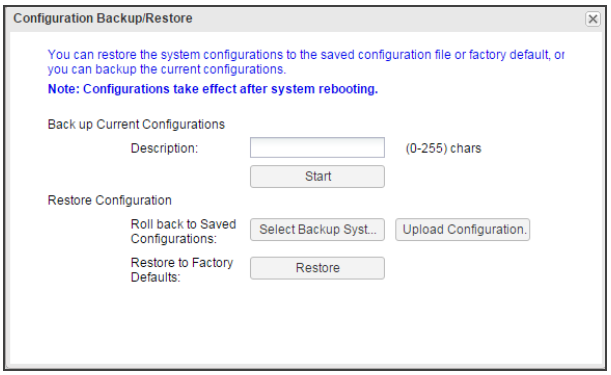
You can not only export or delete the saved configuration files, but also export the current system configurations.

Managing Configuration File

This feature may vary slightly on different platforms. If there is a conflict between this guide and the actual page, the latter shall prevail.

To manage the system configuration files, take the following steps:

1. Select **System** > **Configuration File Management** > **Configuration File List**.
2. In the Configuration File List page, configure the following.
   - Export: Select the configuration file you want to export, and click **Export**.
   - Delete: Select the configuration file you want to delete, and click **Delete**.
   - Backup Restore: You can restore the system configurations to the saved configuration file or factory default, or you can backup the current configurations.



Option	Description
Back up Current Configurations	Type descriptions for the configuration file into **Description** box. Click **Start** to backup.
Restore Configuration	Roll back to Saved Configurations: • Select Backup System Configuration File: Click this button, then select Backup Configuration File from the list. Click **OK**. • Upload Configuration File: Click this button. In the Importing Configuration File dialog box, click **Browse** and choose a local configuration file you need in your PC. If you need to make the configuration file take effect, select the check box. Click **OK**. Restore to Factory Defaults:

Option	Description
	• Click **Restore**, in the Restore to Factory Defaults dialog box, click **OK**.

Note: Device will be restored to factory defaults. Meanwhile, all the system configurations will be cleared, including backup system configuration files.

Viewing the Current Configuration

To view the current configuration file:

1. Select **System** > **Configuration File Management** > **Current Configuration**.
2. Click **Export** to export the current configuration file.

SNMP

The device is designed with a SNMP Agent, which can receive the operation request from the Network Management System and give the corresponding information of the network and the device.

The device supports SNMPv1 protocol, SNMPv2 protocol and SNMPv3 protocol. SNMPv1 protocol and SNMPv2 protocol use community-based authentication to limit the Network Management System to get device information. SNMPv3 protocol introduces an user-based security module for information security and a view-based access control module for access control.

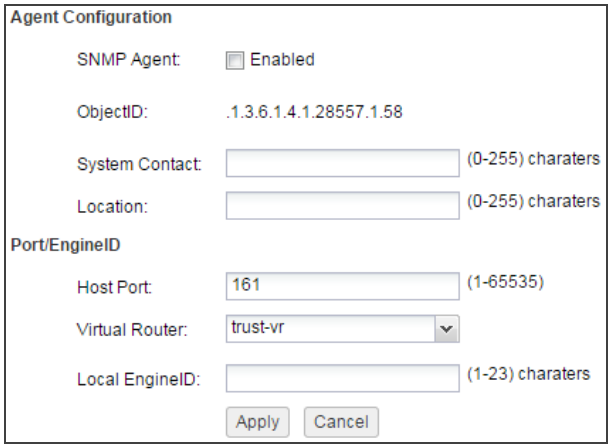
The device supports all relevant Management Information Base II (MIB II) groups defined in RFC-1213 and the Interfaces Group MIB (IF-MIB) using SMIv2 defined in RFC-2233. Besides, the system offers a private MIB, which contains the system information, IPSec VPN information and statistics information of the device. You can use the private MIB by loading it into an SNMP MIB browser on the management host.

SNMP Agent

The device is designed with a SNMP Agent, which provides network management and monitors the running status of the network and devices by viewing statistics and receiving notification of important system events.

To configure an SNMP Agent, take the following steps:

1. Select **System** > **SNMP** > **SNMP Agent**.
2. In the SNMP Agent page, configure these values.



Option	Description
SNMP Agent	Select the **Enable** check box for Service to enable the SNMP Agent function.
ObjectID	The Object ID displays the SNMP object ID of the system. The object ID is specific to an individual system and cannot be modified.
System Contact	Type the SNMP system contact information of the device into the **System Contact** box. System contact is a management variable of the group system in MIB II and it contains the ID and contact of relevant administrator of the managed device. By configuring this parameter, you can save the important information to the device for the possible use in case of emergency.
Location	Type the location of the device into the **Location** box.
Host Port	Type the port number of the managed device into the **Host Port** box.
Virtual Router	Select the VRouter from the **Virtual Router** drop-down list.
Local EngineID	Type the SNMP engine ID into the **Local EngineID** box.

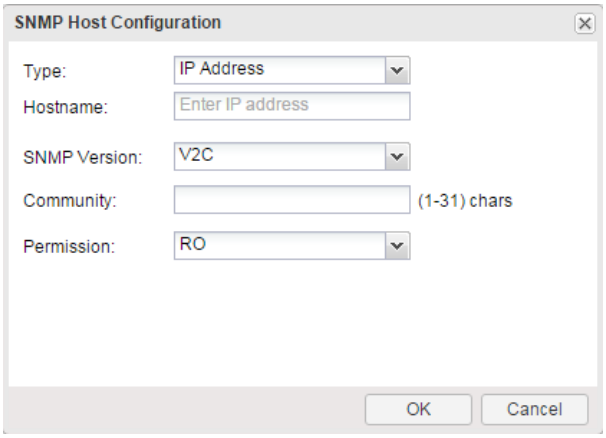
3. Click **Apply**.

Note: SNMP Engine ID identifies an engine uniquely. SNMP Engine is an important component of the SNMP entity (Network Management System or managed network device) which implements the functions like the reception/sending and verification of SNMP messages, PDU abstraction, encapsulation, and communications with SNMP applications.

SNMP Host

To create an SNMP host, take the following steps:

1. Select **System** > **SNMP** > **SNMP Host**.
2. Click **New**.
3. In the SNMP Agent dialog box, configure these values.



Option	Description
Type	Select the SNMP host type from the **Type** drop-down list. You can select **IP Address**, **IP Range** or **IP/Netmask**. • IP Address: Type the IP address for SNMP host into **Hostname** box. • IP Range: Type the start IP and end IP into the **Hostname** box respectively. • IP/Netmask: Type the start IP address and Netmask for SNMP host into the **Hostname** box respectively.
SNMP Version	Select the SNMP version from the **SNMP Version** drop-down list.
Community	Type the community for the SNMP host into the **Community** box. Community is a password sent in clear text between the manager and the agent. This option is only effective if the SNMP version is V1 or V2C.
Permission	Select the read and write permission for the community from the Permission drop-down list. This option is only effective if the SNMP version is V1 or V2C. • RO: Stand for read-only, the read-only community is only allowed to read the MIB information. • RW: Stand for read-write, the read-write community is allowed to

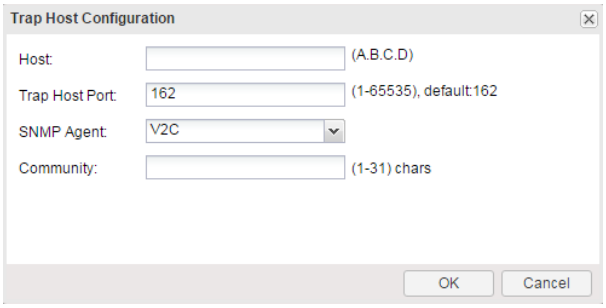
Option	Description
	read and modify the MIB information.

4. Click **OK**.

Trap Host

To create a Trap host, take the following steps:

1. Select **System** > **SNMP** > **Trap Host**.
2. Click **New**.
3. In the Trap Host Configuration dialog box, configure these values.



Option	Description
Host	Type the domain name or IP address of the Trap host into the **Host** box.
Trap Host Port	Type the port number for the Trap host into the **Trap Host Port** box.
SNMP Agent	Select the SNMP version from the **SNMP Agent** drop-down list. • V1 or V2C: Type the community for the Trap host into the **Community** box. • V3: Select the V3 user from the **V3 User** drop-down list. Type the Engine ID for the trap host into the **Engine ID** box.

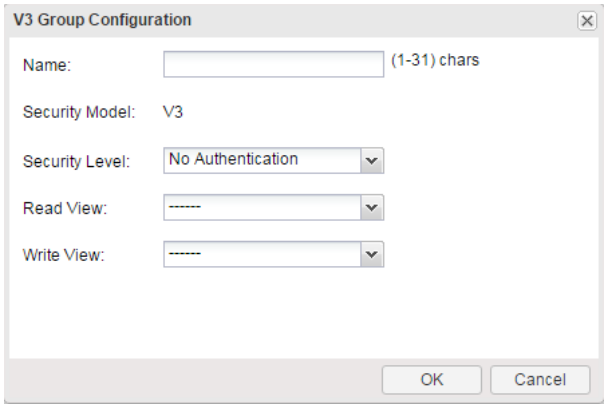
4. Click **OK**.

V3 User Group

SNMPv3 protocol introduces a user-based security module. You need to create an SNMP V3 user group for the SNMP host if the SNMP version is V3.

To create a V3 user group:

1. Select **System** > **SNMP** > **V3 User Group**.
2. Click **New**.
3. In the V3 Group Configuration dialog box, enter values.



Option	Description
Name	Type the SNMP V3 user group name into the **Name** box.
Security Model	The Security model option displays the security model for the SNMP V3 user group.
Security Level	Select the security level for the user group from the **Security Level** drop-down list. Security level determines the security mechanism used in processing an SNMP packet. Security levels for V3 user groups include **No Authentication** (no authentication and encryption), **Authentication** (authentication algorithm based on MD5 or SHA) and **Authentication and Encryption** (authentication algorithm based on MD5 or SHA and message encryption based on AES and DES).
Read View	Select the read-only MIB view name for the user group from the **Read View** drop-down list. If this parameter is not specified, all MIB views will be none.
Write View	Select the write MIB view name for the user group from the **Write View** drop-down list. If this parameter is not specified, all MIB views will be none.

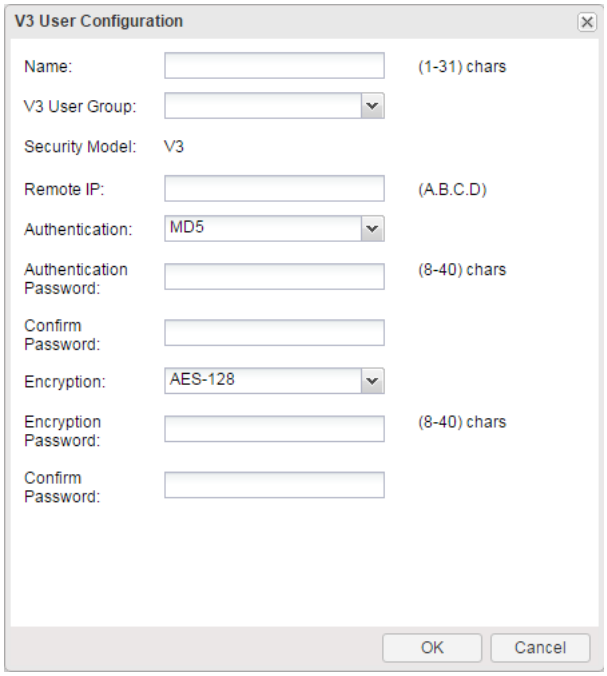
4. Click **OK**.

V3 User

If the selected SNMP version is V3, you need to create an SNMP V3 user group for the SNMP host and then add users to the user group.

To create a user for an existing V3 user group, take the following steps:

1. Select **System** > **SNMP** > **V3 User**.
2. Click **New**.
3. In the V3 User Configuration dialog box, configure these values.



Option	Description
Name	Type the SNMP V3 user name into the **Name** box.
V3 User Group	Select an existing user group for the user from the Group drop-down list.
Security Model	The Security model option displays the security model for the SNMP V3 user.
Remote IP	Type the IP address of the remote management host into the **Remote IP** box.
Authentication	Select the authentication protocol from the **Authentication** drop-down list. By default, this parameter is None, i.e., no authentication.
Authentication Password	Type the authentication password into the **Authentication password** box.
Confirm Password	Re-type the authentication password into the **Confirm Password** box to confirm.
Encryption	Select the encryption protocol from the **Encryption** drop-down list.
Encryption Password	Type the encryption password into the **Encryption Password** box.
Confirm Password	Re-type the encryption password into the **Confirm Password** box to confirm.

4. Click **OK**.

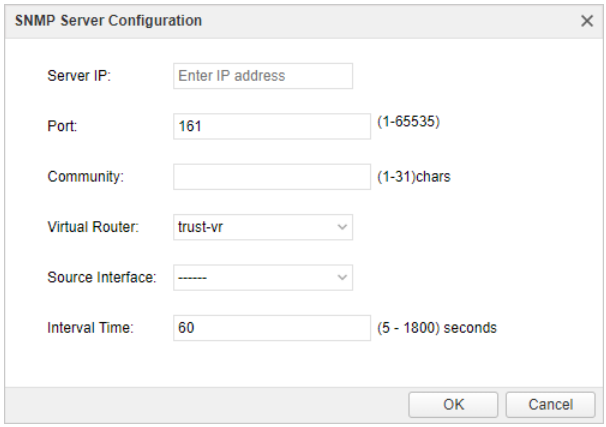
SNMP Server

You can configure the SNMP server to get the ARP information through the SNMP protocol.

Creating an SNMP Server

To create an SNMP server, take the following steps:

1. Select **System** > **SNMP server**.
2. Click **New**.



In the SNMP Server Configuration dialog box, configure these values

Option	Description
Server IP	Type the SNMP server IP address into the **Server IP** box.
Port	Type the port number for the SNMP server into the **Port** box. The value range is 1 to 65535, the default value is 161.
Community	Type the community for the SNMP server into the **Community** box. This option is only effective if the SNMP version is V1 or V2C.
Virtual Router	Select the VRouter from the drop-down list.
Source Interface	Select the source interface from the drop-down list for receiving ARP information on the SNMP server.
Interval Time	Type the the interval into the **Interval Time** box for receiving ARP information on the SNMP server. The value range is 5 to 1800 seconds, the default value is 60 seconds.

3. Click **OK**.

Upgrading System

The firmware upgrade wizard helps you:

- Upgrade system to a new version or roll back system to a previous version.
- Update the Signature Database.

Upgrading Firmware

Upgrading the system of vFW is very different from that of a hardware firewall. You need to refer to the *SG6000-VM Installation Guide* for detailed operation of how to upgrade vFW operating system.

Updating Signature Database

To update signature database, take the following steps:

1. Select **System** > **Upgrade Management** > **Signature Database Update**.
2. In the Signature Database Update tab box, configure the following.

Option	Description
Current Version	Show the current version number.
Remote Update	Application signature database, URL signature database, Sandbox Whitelist Database, Antivirus signature database, IPS signature database , IP reputation database , Botnet C&C Prevention signature database. • Update Now: Click **Update** to update the signature database right now. • Auto Update: Select **Enable Auto Update** and specify the auto update time. Click **Save** to save your changes. • Configure Update Server: By default the system updates the signature database everyday automatically. You can change the update configuration as needed. Hillstone devices provide two default update servers: update1.hillstonenet.com and update2.hillstonenet.com. You can customize the servers according to your need. In the pop-up Auto Update Settings dialog box, specify the server IP or domain name and Virtual Router. • Configure Proxy Server: When the device accesses the Internet through a HTTP proxy server, you need to specify the IP address and the port number of the HTTP proxy server. With the HTTP proxy server specified, various signature database can update normally. Click **Configure Proxy Server**, then enter the IP addresses and ports of the main proxy server and the backup proxy server. Mitigation rule database, Abnormal behavior mode database or Malware behavior mode database. • Update Now: Click **Update** to update the signature database right now. • Auto Update: Select **Enable Auto Update** and specify the auto update time. Click **Save** to save your changes. • Server: By default the system updates the signature database everyday automatically. You can change the update configuration as needed. Devices provide two default update servers: update1.hillstonenet.com and update2.hillstonenet.com. You can customize the servers according to your need. In the pop-up Auto Update Settings dialog box, specify the server IP or domain name

Option	Description
	and Virtual Router. • Server: Devices provide a default update servers: sec-cloud.hill-stonenet.com.
Local Update	Click **Browse** and select the signature file in your local PC, and then click **Upload**.

CloudEdge License

System provides license controlled capacities. Only after installing formal license can the CloudEdge reach the listed capacity. To purchase a license, please contact sales people (click here).

Licenses

CloudEdge licenses are categorized to platform licenses, sub licenses, function licenses and private cloud platform licenses. A platform license is the base to install all other types of licenses.

Note: If your CloudEdge is a full license product, you do not need to purchase or install any license. It is already a full feature firewall when you purchase it.

Platform Licenses

- **Default License**
  CloudEdge has a built-in free default license. All features are available in system with default license, such as SSL VPN, iQoS and IPS. However, performance is limited, e.g., only 2 IPSec VPN tunnels and 2 SSL VPN users are supported. The license is valid for 30 days. After expiration, all functions of the system can not be used, the OS version and all the signature databases can not be upgraded.
- **Platform Trial License**
  After the installation of Platform Trial License, you will get the same features as system with Platform Base License. But the duration will be shorter. The duration is determined by the agreement you signed, which is a relative period, for example, one month. After expiration, the existing configuration can not be modified. After the reboot, the original configuration can not be displayed, the default configuration instead, and only the platform functions are available while the performance is limited. So, reboot is not recommended.
- **Platform Sub License**
  After the installation of Platform Sub License, you will get the same features as system with Platform Base License. But the duration will be shorter. The duration is determined by the agreement you signed, which is an absolute period, for example, March 1 to March 31. After expiration, the existing configuration can not be modified. After the reboot, only the platform functions are available while the performance is limited.
- **Platform Base License**
  When a CloudEdge is officially purchased, you can buy a Platform Base License. Platform Base License provides fundamental firewall features.
  When it expires, the system can be normally functioning, but cannot be upgraded to higher version.

Sub Licenses

Sub licenses control whether corresponding functions are enabled or not and the time limit as well.

- **IPSec VPN Sub License**
  IPSec VPN sub License enables IPSec VPN function and authorizes the maximum number of IPSec VPN accesses. After installing multiple IPSec VPN licenses, you can increment the maximum number of IPSec VPN accesses. When the license expires, the IPSec VPN connection will be disconnected. IPSec VPN function will not be allowed to configure. Until the device is restarted, all the configurations of IPSec VPN will not be lost.
- **SSL VPN Sub License**
  SSL VPN Sub License enables SSL VPN function and authorizes the maximum number of SSL VPN accesses. After installing multiple SSL VPN licenses, you can increment the maximum number of SSL VPN accesses. When the license expires, the SSL VPN connection will be disconnected. SSL VPN function will not be allowed to configure. Until the device is restarted, all the configurations of SSL VPN will not be lost.
- **iQoS Sub License**

iQoS sub license enables iQoS function. When the iQoS sub license expires, all the configurations of iQoS will not be lost until the device is restarted.

Function Licenses

Some functions are only enabled when that corresponding license is installed. The function service includes:

- **Intrusion Prevention System (IPS) License**
  IPS License provides IPS function and its signature database upgrade. IPS License has its own validity. When it expires, the IPS function works normally, but IPS signature database cannot be upgraded.
- **Anti-Virus (AV) License**
  AV License provides anti-virus function and its signature database upgrade. AV License has its own validity. When it expires, the anti-virus function works normally, but AV signature database cannot be upgraded.
- **Sandbox License**
  Sandbox License provides sandbox function, which controls the suspicious file quantity allowed to be uploaded to the cloud sandbox every day, also, it provides white list upgrade. Sandbox License has its own validity. When it expires, the cloud analysis is stopped and the white list can not be upgraded. However, if the suspicious traffic still matches the analysis entries in the local cache, the sandbox function is still valid. After the system is restarted, the sandbox function will not be used.
- **URL DB License**
  URL DB License provides URL filter function and allows URL database to upgrade. URL DB License has its own validity. When it expires, the URL filter function works normally, but URL database cannot be upgraded.
- **APP DB License**
  APP DB License allows APP database to upgrade. APP DB license is issued with platform license. There is no need to apply for it. The validity of APP DB License also follows platform license. When the platform license expires, APP signature database cannot be upgraded.

Note:

- Besides the licenses listed above, a hardware platform from Hillstone Networks, Inc. can install other types of licenses, e.g. StoneShield, but currently, CloudEdge does not support licenses other than those listed here.
- Perimeter Traffic Filtering (PTF) function can be seen in StoneOS, but it is not available for the moment. Future versions will support the two functions.
- Currently, Anti-Virus (AV) License and Sandbox License are not available in CloudEdge for private cloud platform.

Private Cloud Platform Licenses

Private cloud platform licenses include platform trial licenses and platform base licenses. To be compatible with CloudEdge licenses for various cloud environments, please install the private cloud platform license first and insert the USB-Key after reboot when you deploy CloudEdge in a private cloud environment. After the installation of the private cloud platform license, the initial SN of the system will be replaced with the SN in the private cloud platform license, so licenses for CloudEdge deployed in non-private cloud environment can be installed in the current system and the priority is higher than that of the private cloud.

When the private cloud platform license expires, the sub license and function license are still valid. However, the relevant functions ares not configurable until the system is restarted.

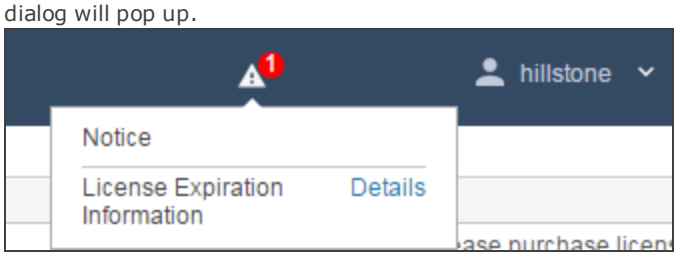
If private cloud platform license is uninstalled and there is no license for private cloud environment, the SN will be restored to the initial SN after reboot. At the same time, all non-private cloud licenses that has been installed will be invalid.

Viewing License List

Select **System** > **License** > **License** to enter the License List page. All licenses the system supports will be displayed in this page, including the authorized licenses and unauthorized licenses.

If there is license that is about to expire (the remaining valid period is within 30 days) or has expired:

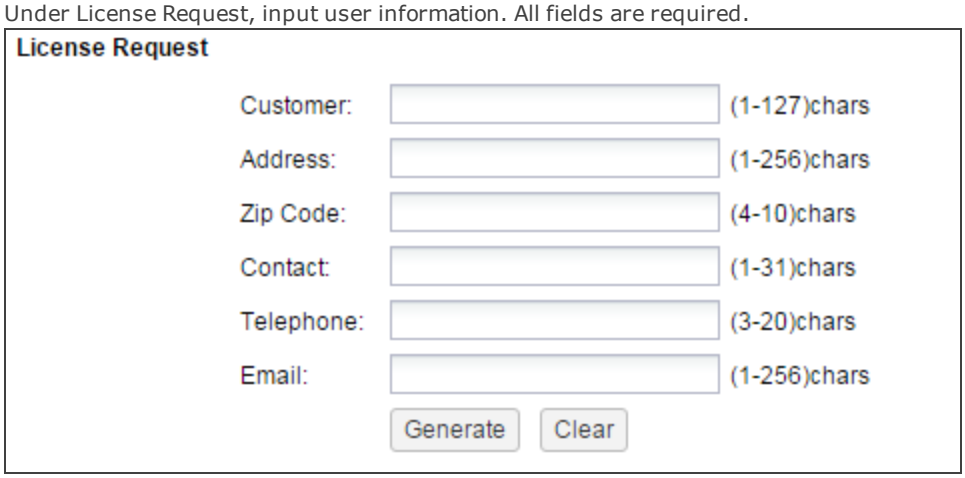
- When you log into the device, the **License Expiration Information** dialog box will pop up, which prompts for licenses that are about to expire or have expired. Check the **Don't remind me again** checkbox so that the dialog box will never prompt again when you login. Click the **Update Now** button to jump to the License List page.
- The notification icon with the number of notifications is displayed in the upper-right corner. Hover your mouse over the icon, and click **Details** after the License Expiration Information, the **License Expiration Information** dialog will pop up.



Applying for a License

Before you apply for a license, you have to generate a license request first.

1. Select **System** > **License** > **License**.
2. Under License Request, input user information. All fields are required.



3. Click **Generate**, and then appears a bunch of code.
4. Send the code to your sales contact. The sales person will issue the license and send the code back to you.

Installing a License

After obtaining the license, you must install it to the device.

To install a license, take the following steps:

1. Select **System** > **License** > **License**.
2. Under License installation in the License page, configure options below.

Option	Description
Upload License File	Select **Upload License File**. Click **Browse** to select the license file, using the TXT format, and then click OK to upload it.
Manual Input	Select **Manual Input**. Type the license string into the box.

3. Click **OK**.

Verifying License

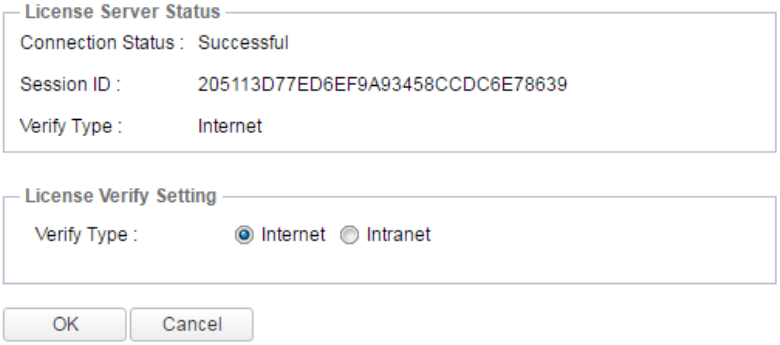
For Hillstone CloudEdge virtual firewall, after installing the license, you need to connect to the license server to verify the validity of the license to prevent the license from being cloned. System supports two ways, one is connected to the public Internet license server check, another is by LAN connection to the LMS (License Management System), you can choose one of these ways according to need.

• The way by public Internet license server is used in some small private clouds or industry cloud scenarios. After the virtual firewall connects to the public server, the server will provide the validation of the license (currently the public network server does not provide the distribution and management of the licenses). If the cloned license is found or the virtual firewall is not checked by server, the virtual firewall will be restarted in 30 days.

• The way by LAN LMS is suitable for the large-scale public cloud scenarios. After the virtual firewall connect to the LMS, the LMS not only provides license validation, but also provides automatic distribution and management of licenses. If the cloned license is found or the virtual firewall is not checked by server, the server will recover all virtual firewall(clone or be cloned firewall) license and restart the virtual firewall; if the virtual firewall does not connect to the server to check, virtual firewall will restart in 30 days.

To verify licenses, take the following steps:

1. Select **System** > **License**> **License Verify**.



2. At the top of the page is the **License Server Status** bar, which shows the server's connection status, session ID, and verify type.
3. Below the page is the **License Verify Setting** bar, you can use one of the following two ways according to need:
   - Internet：select **"Internet**" , click **OK**. The virtual firewall will verify the license through the public server.
   - Intrane: select **"Intrane"**, and specify the server's " Address" and "Port",click **OK**.The virtual firewall's license will be checked, distributed and managed through the LMS.
4. Go to **System > Device Management**, and click the **Option** tab.
5. Click **Reboot**, and select **Yes** in the prompt.
6. The system will reboot. When it starts again, installed license(s) will take effect.

Note: When you verify your license through a public server, make sure that the interface connected to the public server is in the trust-vr zone and that you can access the Internet through the trust-vr zone.For more information about LMS, refer to <LMS User Guide>.

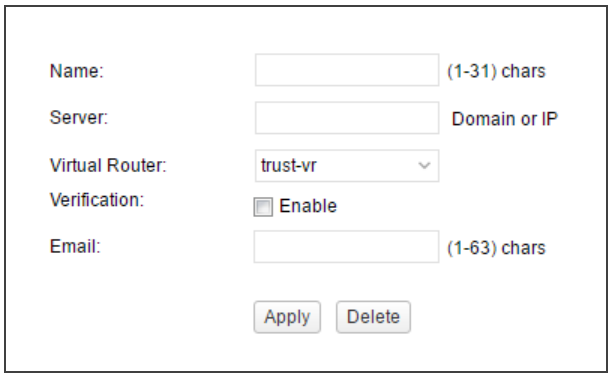
Mail Server

By configuring the SMTP server in the Mail Server page, the system can send the log messages to the specified email address.

Creating a Mail Server

To create a mail server, take the following steps:

1. Select **System** > **Mail Server**.
2. In the SMTP Server Configuration page, configure these values.



Option	Description
Name	Type a name for the SMTP server into the box.
Server	Type Domain name or IP address for the SMTP server into the box.
Virtual Router	From the **Virtual Router** drop-down list, select the Virtual Router for the SMTP server.
Verification	Select the **Enable** check box for SMTP verification to enable it if needed. Type the username and its password into the corresponding boxes.
Email	Type the email address that sends log messages.

3. Click **Apply**.

Connecting to HSM

Hillstone Security Management (HSM) is a centralized management platform to manage and control multiple Hillstone devices. Using WEB2.0 and RIA (Rich Internet Application) technology, HSM supports visualized interface to centrally manage policies, monitor devices, and generates reports.

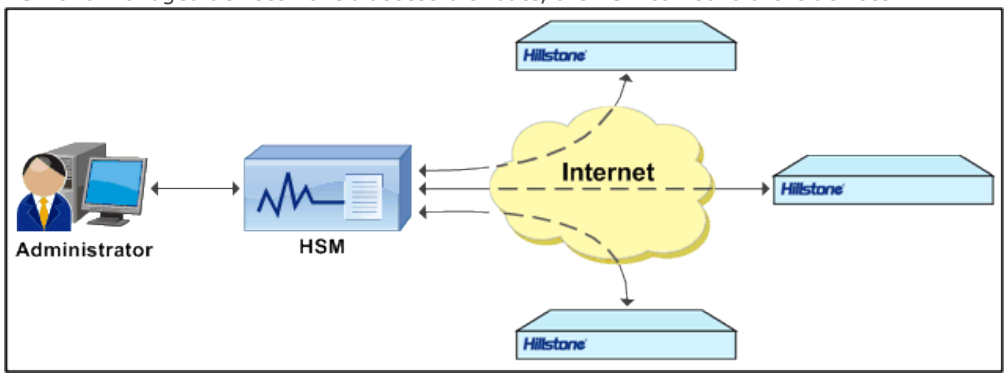
Each firewall system has an HSM module inside it. When the firewall is configured with correct HSM parameters, it can connect to HSM and be managed by HSM.

Note: For more information about HSM, please refer to HSM User Guide.

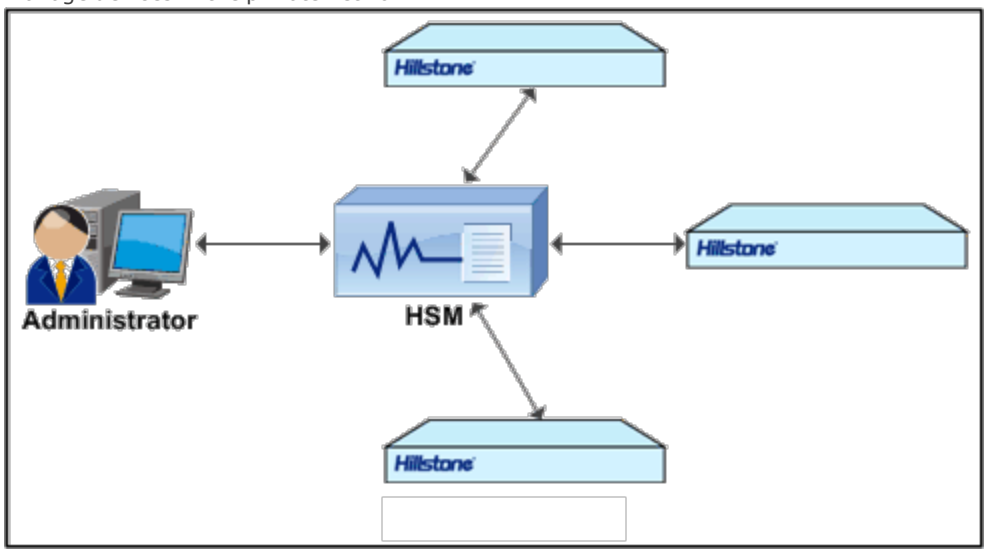
HSM Deployment Scenarios

HSM normally is deployed in one of the two scenarios: installed in public network or in private network:

- Installed in public network: HSM is remotely deployed and connected to managed devices via Internet. When the HSM and managed devices have a accessible route, the HSM can control the devices.



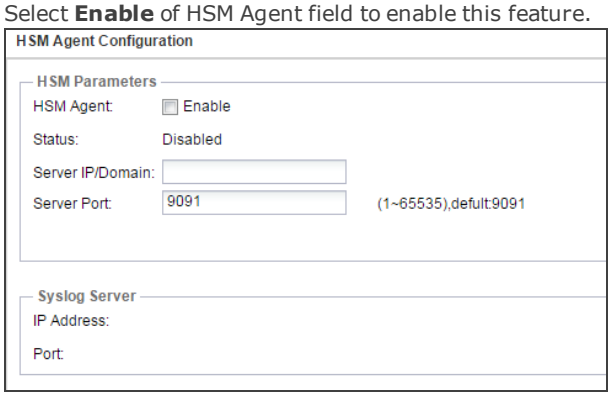
- Installed in private network: In this scenario, HSM and the managed devices are in the same subnet. HSM can manage devices in the private network.



Connecting to HSM

To configure HSM parameters in the firewall, take the following steps:

1. Select **System > HSM Agent**.
2. Select **Enable** of HSM Agent field to enable this feature.



3. Input HSM server's IP address in the Sever IP/Domain text box. The address cannot be 0.0.0.0 or 255.255.255.255, or mutlicast address.
4. Enter the port number of HSM server.
5. Click **OK**.

Note: The Syslog Server part shows the HSM server's syslog server and its port.

Connecting to Hillstone CloudView

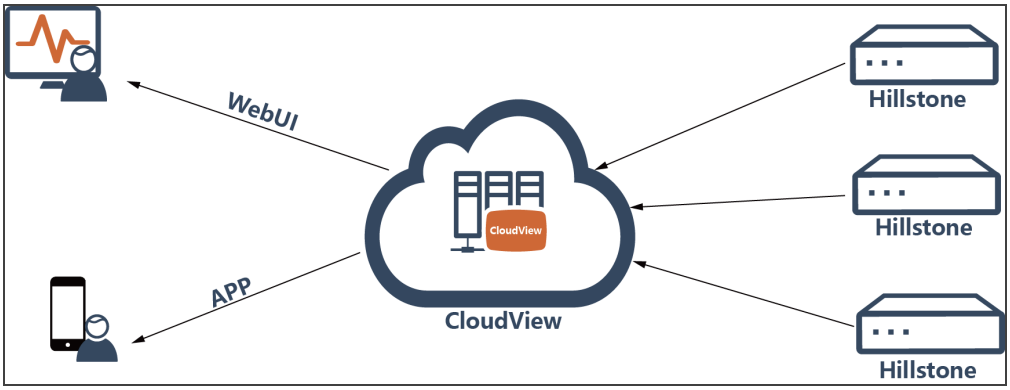
CloudView is a SaaS products of security area and a cloud security services platform in the mobile Internet era. CloudView deployed in the public cloud to provide users with online on-demand services. Users can get convenient, high quality and low cost value-added security services through the Internet and APP, and get a better security experience.

After the Hillstone device is properly configured to connect the CloudView , you can achieve the Hillstone device registration to the public cloud and the connection with the Cloud ·View, and then to achieve the Cloud ·View remote monitoring device.

CloudView Deployment Scenarios

The main deployment scenarios of CloudView are described as follows:

When Hillstone devices register to the public cloud, the device information, traffic data, threat event, and system logs are uploaded to the cloud, which provides a visual display. Users can through the Web or mobile phone APP monitor the device status information, reports, threat analysis, etc.

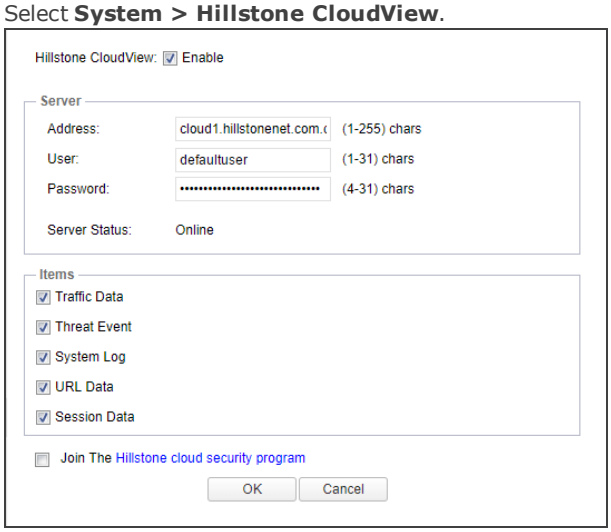


Note: About CloudView, see CloudView FAQs page.

Connecting to Hillstone CloudView

When using the CloudView, the device needs to connect to the CloudView server.

1. Select **System > Hillstone CloudView**.



2. Select the **Enable** check box of Hillstone CloudView.
3. Enter the URL of the CloudView server. The default configuration is cloud.hillstonenet.com.cn.
4. Enter the username of CloudView. Register the device to this user.
5. Enter the password of the user.
6. **Server Status** displays the CloudView status.
7. Select **Traffic Data** to upload the monitor data.
8. Select **Threat Event** to upload the threat events detected by the Hillstone device.
9. Select **System Log** to upload the event logs.
10. Select **URL Data** to upload the URL data.
11. Select **Session Data** to upload the session data.
12. Select whether to join the Hillstone cloud security program. This program will upload the threat prevention data to cloud intelligence server. The uploaded data will be used for internal research to reduce false positives and to achieve better protection of the equipment.
13. Click **OK**.