



Sangfor NSF V8.0.85 Professional

High Availability





1 Basic Elements of High Availability

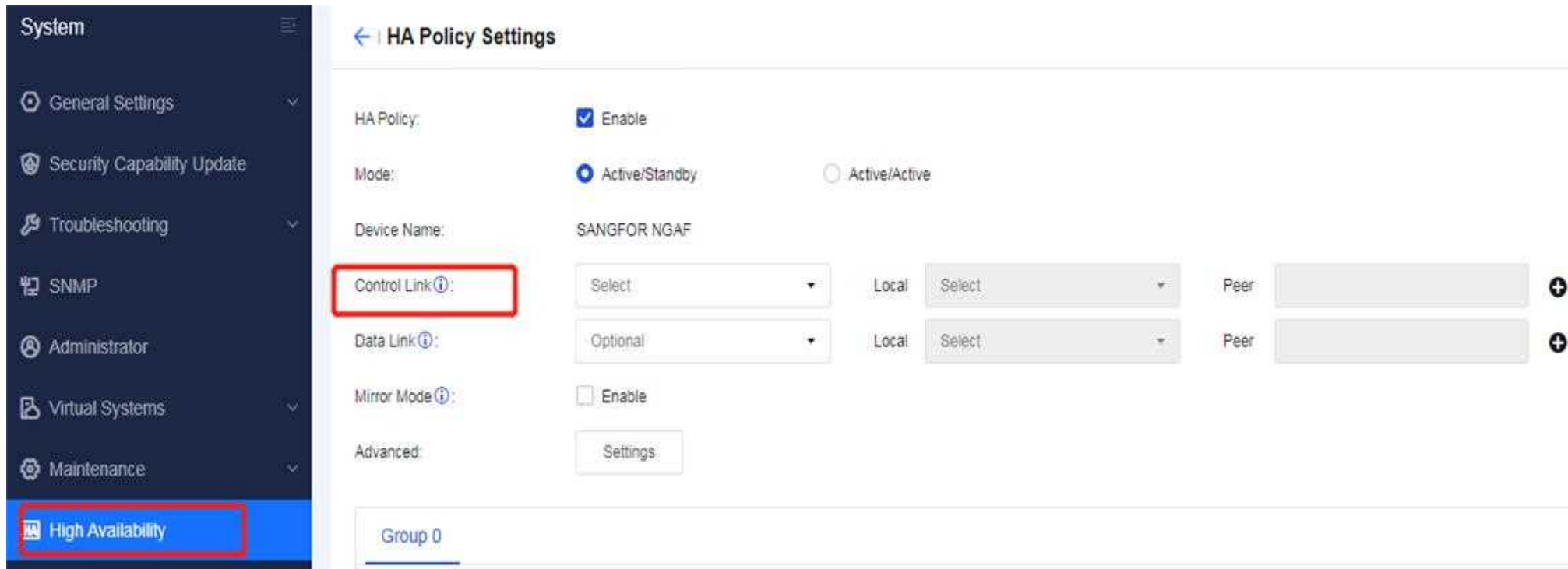
2 Types of High Availability

3 Case Study of High Availability

PART 1

Basic Elements of High Availability

The control link is in charge for synchronizing heartbeat packets, which include configuration and status information. Both remote and local sides have to appoint the same interface for control link interface. Control link is a mandatory setting which cannot be ignored.



System

- General Settings
- Security Capability Update
- Troubleshooting
- SNMP
- Administrator
- Virtual Systems
- Maintenance
- High Availability**

HA Policy Settings

HA Policy: ☒ Enable

Mode: ☒ Active/Standby ☐ Active/Active

Device Name: SANGFOR NGAF

Control Link ⓘ: Select Local Select Peer +

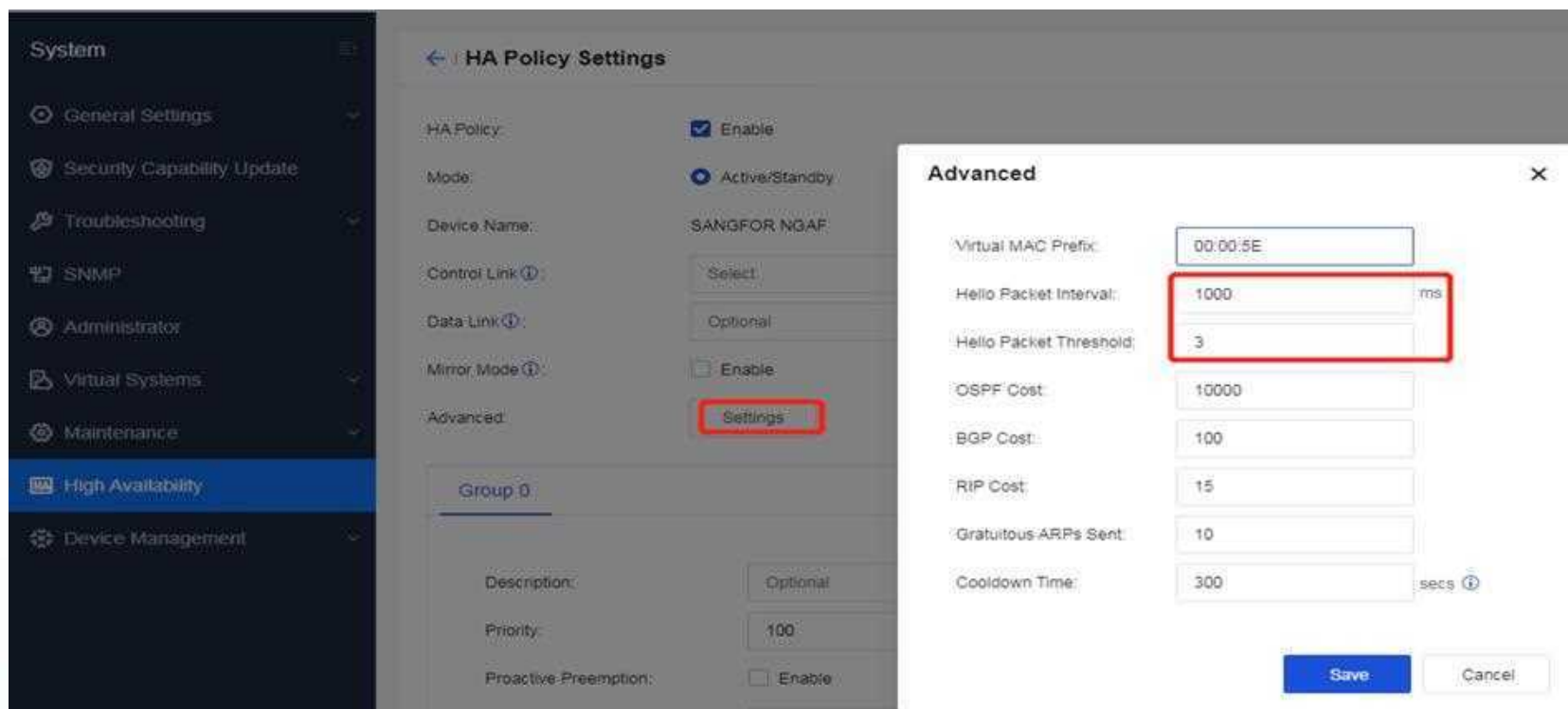
Data Link ⓘ: Optional Local Select Peer +

Mirror Mode ⓘ: ☐ Enable

Advanced: Settings

Group 0

By default, a hello message is sent every 1000 ms. If more than 3 consecutive hello messages are not received by the other side, it is considered that the remote NSF has encountered a failure. Users can modify default settings in the advanced settings page.



Data link is in charge for synchronizing sessions, which is an optional setting. If you don't configure data link, control link will take over for synchronizing sessions. If data link is configured, it will represent control link for synchronizing heart-beats packets, only as control link fails.

← HA Policy Settings

HA Policy: ☒ Enable

Mode: ☒ Active/Standby ☐ Active/Active

Device Name: SANGFOR Network Secure

Control Link ⓘ: Select ▼ Local Select ▼ Peer + ▼

Data Link ⓘ: eth1 ▼ Local 192.168.1.2 ▼ Peer + ▼

ⓘ The data sync interfaces of the active and standby devices must be consistent. Otherwise, synchronization error may occur. ✕

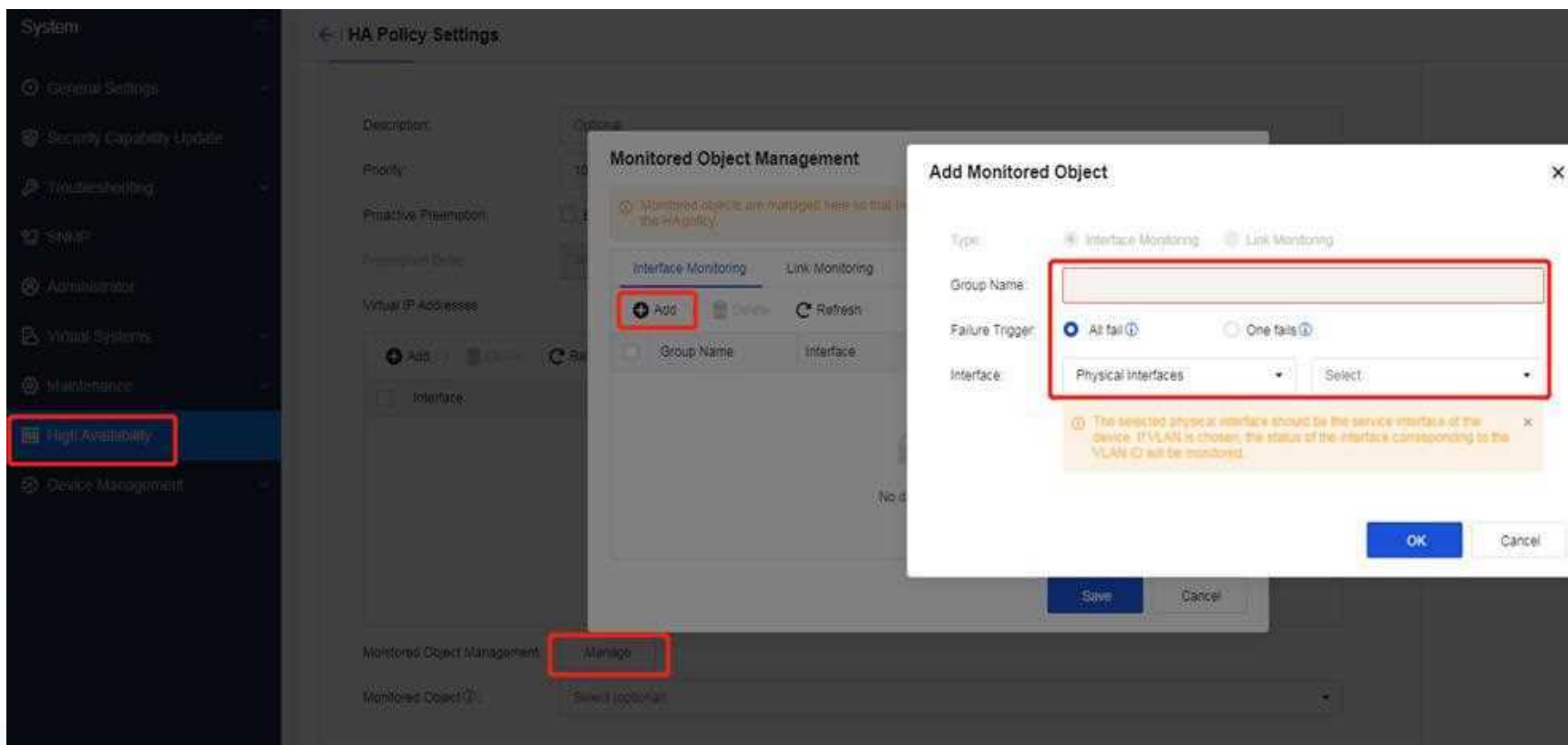
Mirror Mode ⓘ: ☐ Enable

Advanced: Settings

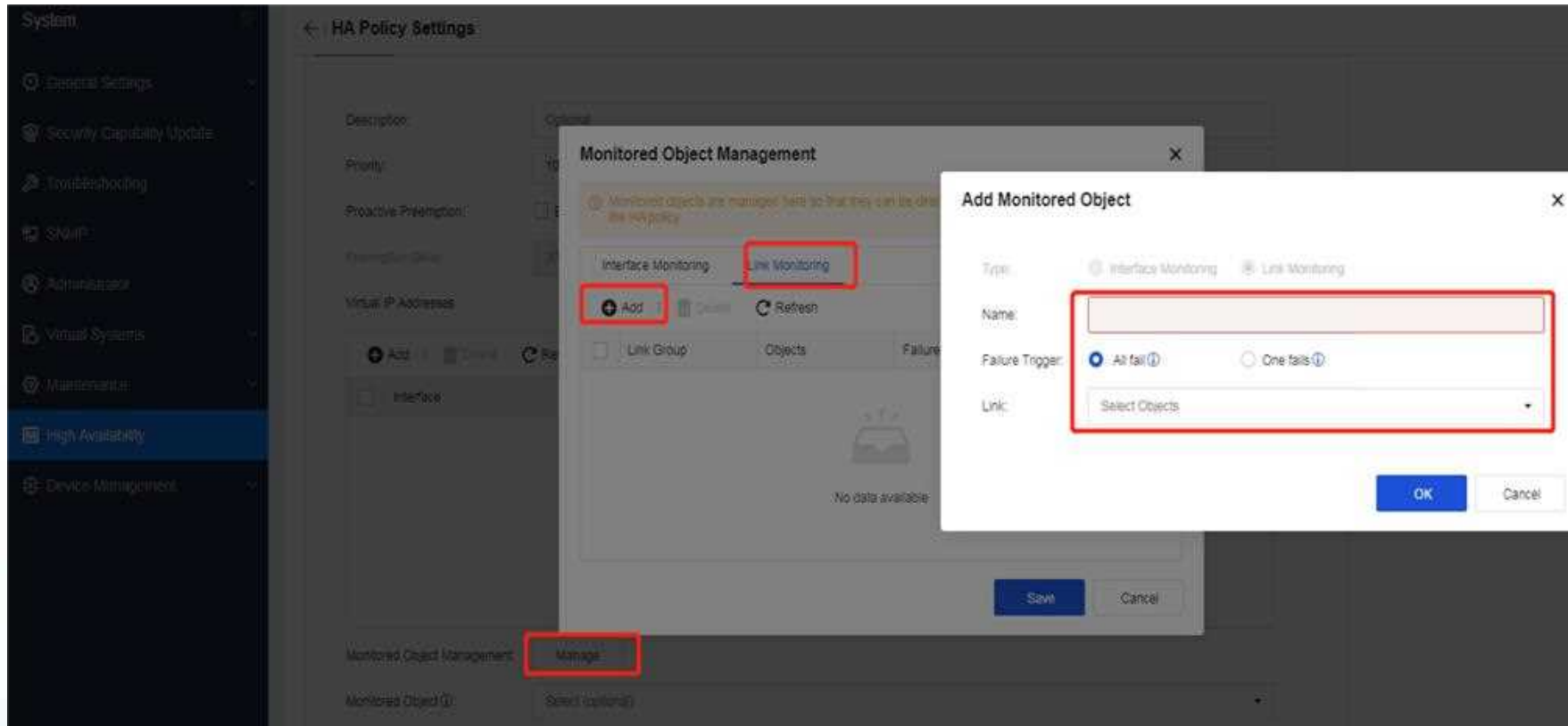
Interface Monitoring



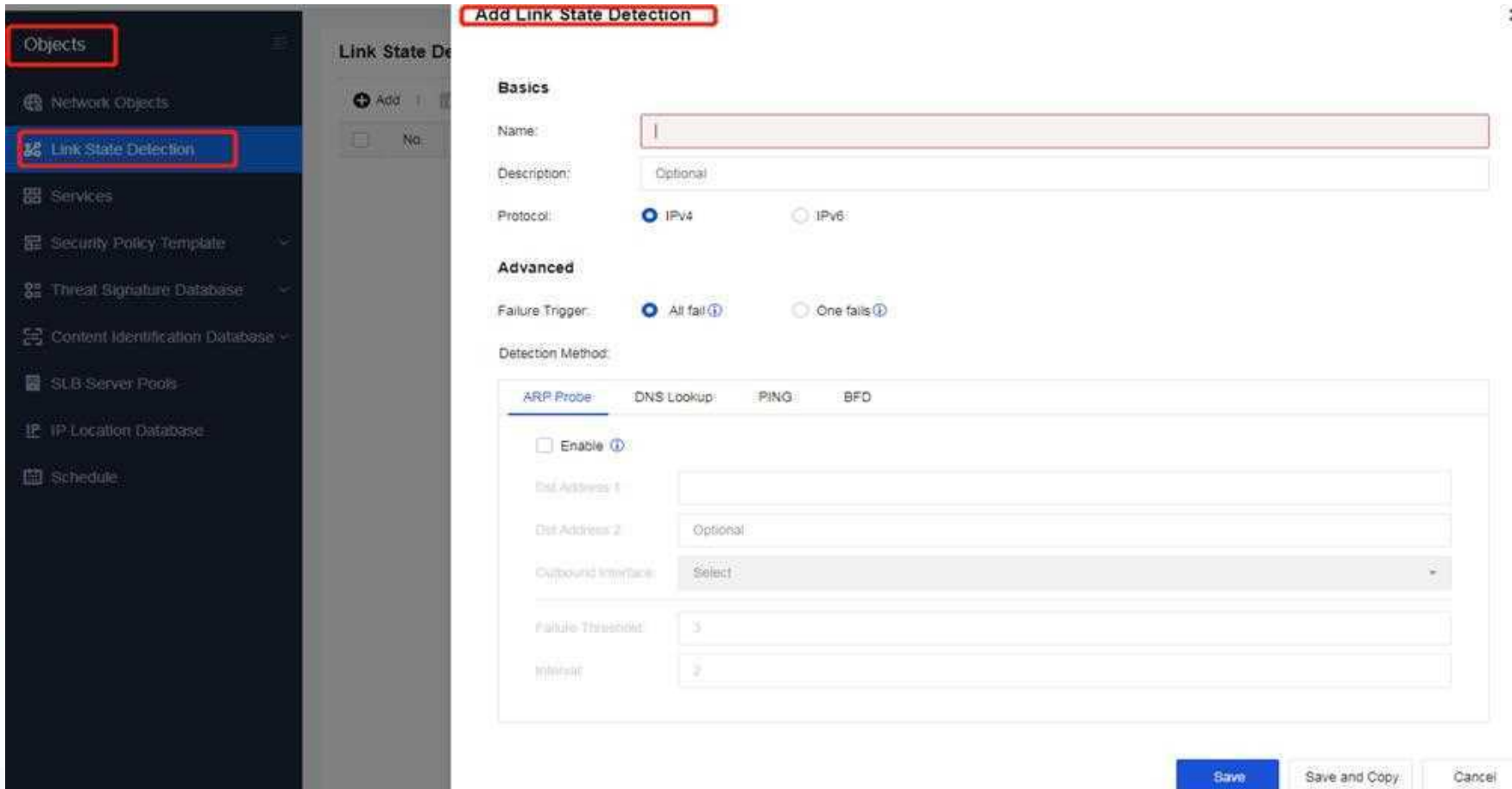
Interface monitoring is used to monitor the status of interfaces. An interface is considered to be in a "failure" state when it is either unplugged or in disabled status. The interface monitoring object can monitor multiple interfaces. If the trigger type is set to "All fail", the interface monitoring object become a "failure" status only when all the interfaces fail. If the trigger type is set to "One fails", the interface monitoring object become a "failure" status as long as one of the interfaces fails..



The link monitoring object is used for monitoring uplink and downlink devices. If uplink or downlink device suffer failure, the link monitoring object will become "failure" state. The link monitoring group can monitor multiple link monitoring objects. If the trigger type is set to "All fail", link monitoring object enters a "failure" status only when all the link monitoring objects fail. If the trigger type is set to "One fails", the link monitoring enters a "failure" status as long as one of the link monitoring objects fails.

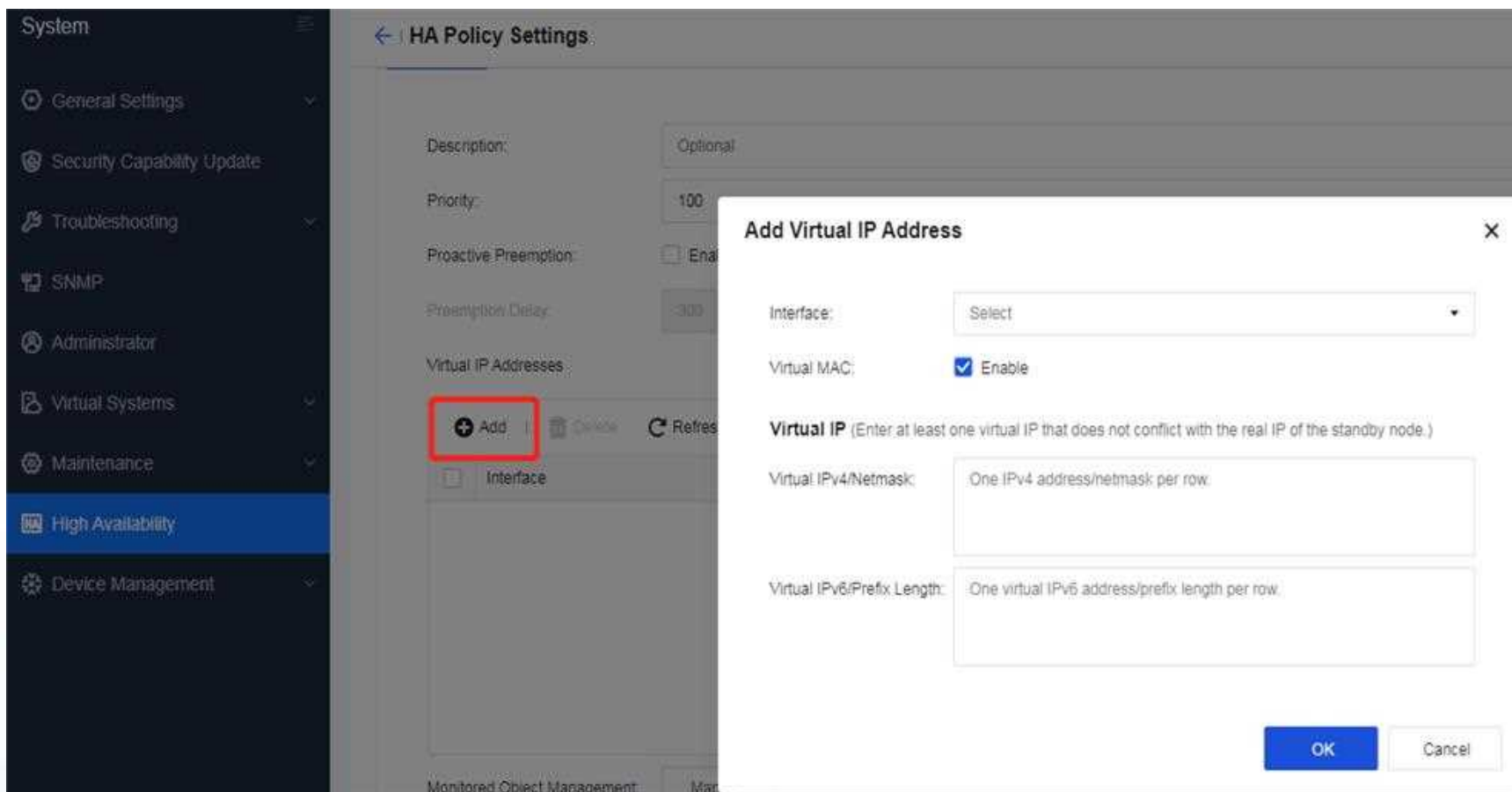


When you want to monitor link objects in high availability settings, it is necessary to configure link state detection in advance. The path is **Objects > Link State Detection**. In this page you can select expected types of detection, such as ARP Probe, DNS Lookup, Ping and BFD.

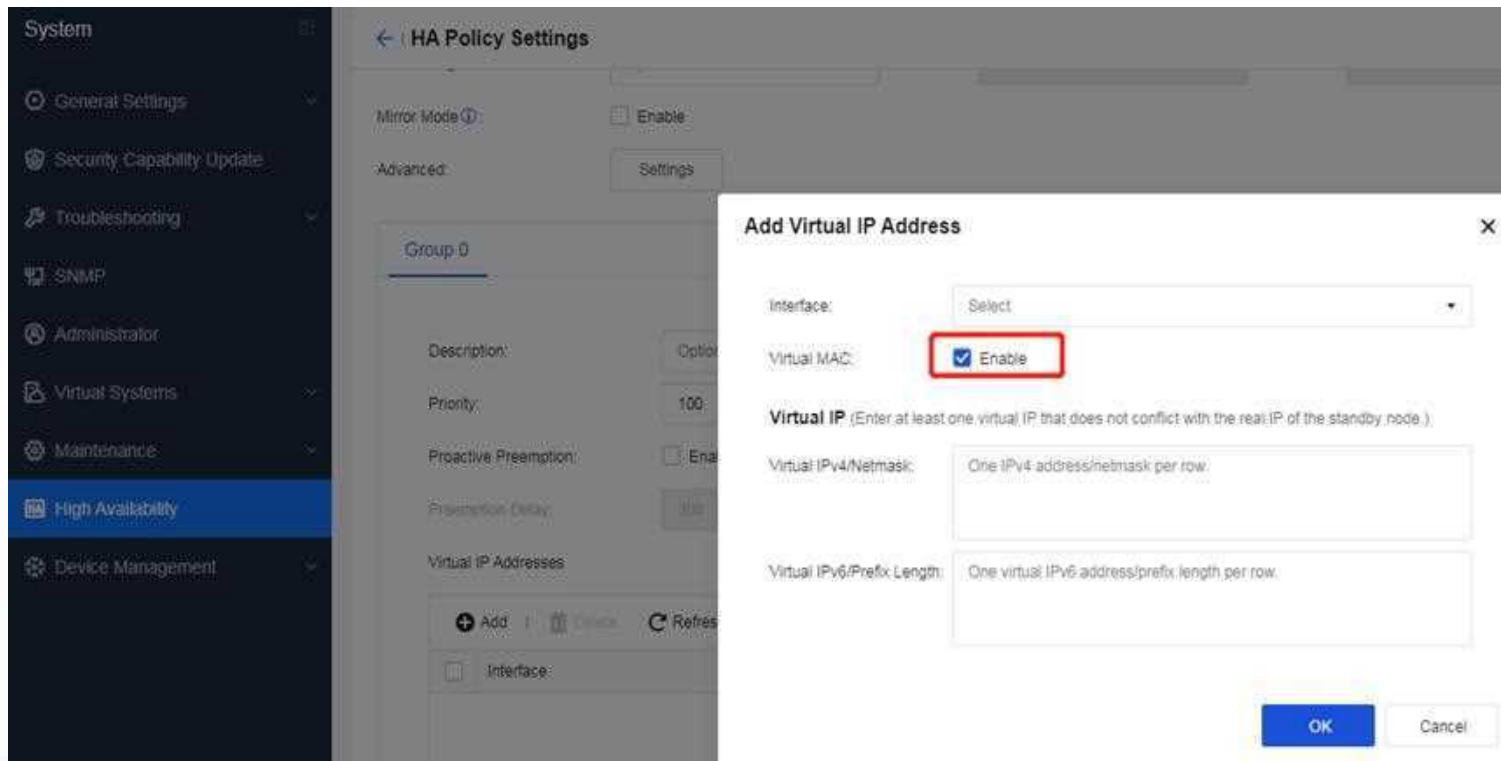


The screenshot displays the Sangfor management console interface. On the left sidebar, the 'Objects' menu is highlighted, and 'Link State Detection' is selected. The main panel shows the 'Add Link State Detection' configuration window. The window is divided into 'Basics' and 'Advanced' sections. In the 'Basics' section, the 'Name' field is empty, and the 'Protocol' is set to 'IPv4'. In the 'Advanced' section, the 'Failure Trigger' is set to 'All fail', and the 'Detection Method' is set to 'ARP Probe'. The 'ARP Probe' tab is active, showing fields for 'Enable' (unchecked), 'Dest Address 1', 'Dest Address 2' (Optional), 'Outbound Interface' (Select), 'Failure Threshold' (3), and 'Interval' (3). The 'Save' button is highlighted in blue.

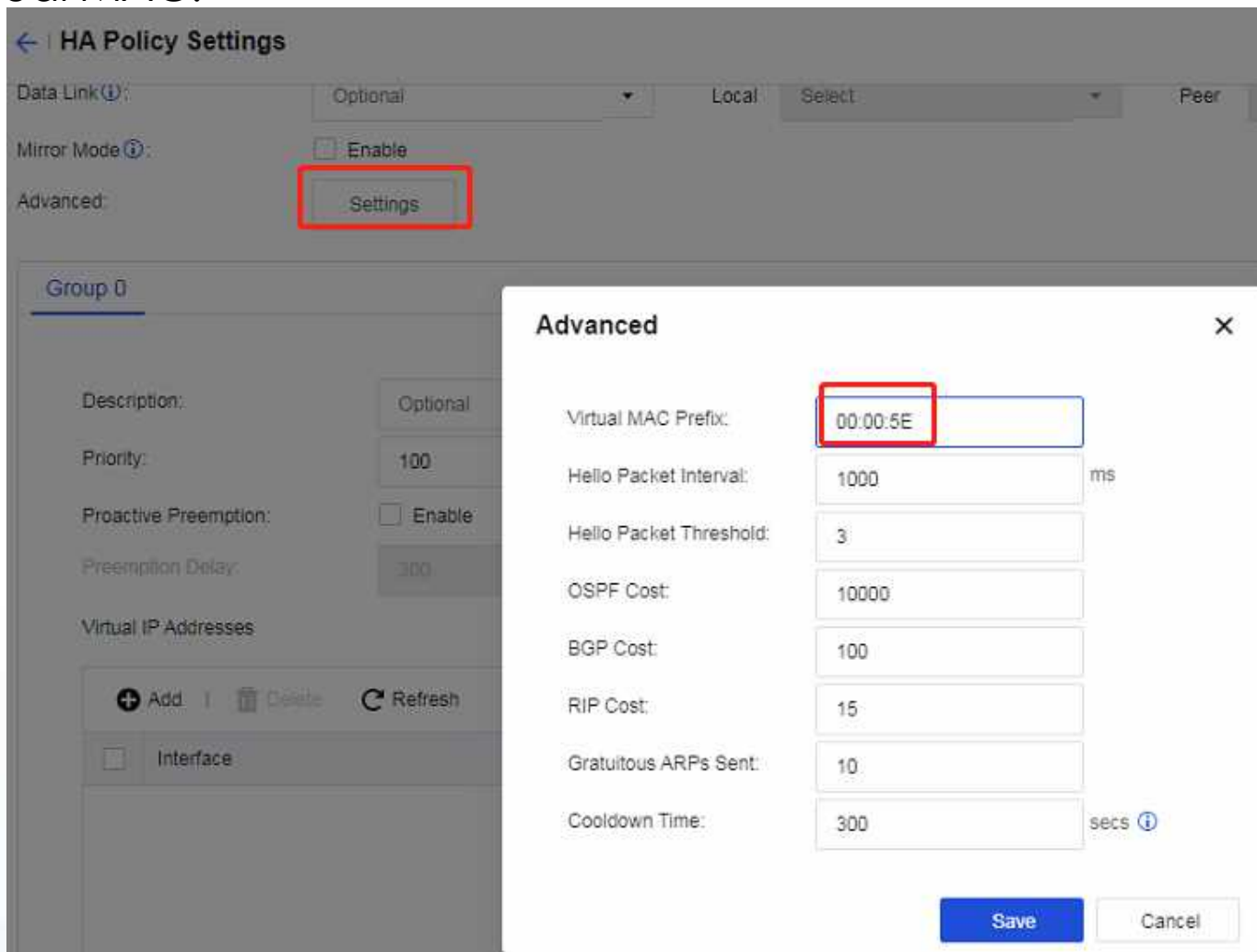
If an IP needs to be synchronized between active and standby NSF and forward business traffic, it is called the virtual IP. Compared to a real IP, the virtual IP is synchronized from active to standby NSF and only issued by the active NSF, rather than the standby NSF. When switchover occurs between active and standby NSF, the latest active NSF will issue the virtual IP.



When active and standby NSF perform a switchover, the latest active NSF sends gratuitous ARP packets to uplink and downlink devices to notify them of the MAC address. Since NIC MAC address (called real MAC address) in active and standby NSF is different. Either real MAC address or virtual MAC forwards traffic. When uplink and downlink devices receive gratuitous ARP, their MAC address table will refresh. Virtual MAC is born with virtual IP, while both in active and standby NSF, virtual MAC is same. To some extent virtual MAC address will be more efficient than real MAC address during switchover since to uplink and downlink devices the MAC address table will not be changed.



Virtual MAC can be generated automatically, while users are able to check or modify default prefix of virtual MAC.



The screenshot displays the 'HA Policy Settings' interface. In the 'Advanced' section, the 'Settings' button is highlighted with a red box. An 'Advanced' dialog box is open, showing various configuration options. The 'Virtual MAC Prefix' field is highlighted with a red box and contains the value '00:00:5E'. Other fields include 'Hello Packet Interval' (1000 ms), 'Hello Packet Threshold' (3), 'OSPF Cost' (10000), 'BGP Cost' (100), 'RIP Cost' (15), 'Gratuitous ARPs Sent' (10), and 'Cooldown Time' (300 secs). The 'Save' and 'Cancel' buttons are at the bottom right of the dialog.

Field	Value	Unit
Virtual MAC Prefix	00:00:5E	
Hello Packet Interval	1000	ms
Hello Packet Threshold	3	
OSPF Cost	10000	
BGP Cost	100	
RIP Cost	15	
Gratuitous ARPs Sent	10	
Cooldown Time	300	secs

Group 0 and Group 1



Either group 0 or 1 represents a set of high availability. In active/standby mode, only group 0 can be seen since there is only one set of high availability. Only in active/active as well as layer-3 mode, there are two sets of high availability, requiring two NSF respectively act as active node and standby node in two groups to forward business traffic. Therefore, only the active/active as well as layer-3 mode has group 0 and group 1 .

HA Policy Settings

HA Policy: ☒ Enable

Mode: ☒ Active/Standby ☐ Active/Active

Device Name: HQ-NGAF

Control Link: Select Local Select Peer

Data Link: Optional Local Select Peer

Mirror Mode: ☐ Enable

Advanced: Settings

Group 0

Description: Optional

Priority: 100

Proactive Preemption: ☐ Enable

Preemption Delay: 300 secs

Virtual IP Addresses

Interface	Virtual IP/Netmask	Virtual MAC	Operation

HA Policy Settings

HA Policy: ☒ Enable

Mode: ☐ Active/Standby ☒ Active/Active

Device Name: HQ-NGAF

Control Link: Select Local Select Peer

Data Link: Optional Local Select Peer

Layer 2 Mode: ☐ Enable

HA Traffic: ☐ Enable

Advanced: Settings

Group 0 Group 1

Description: Optional

Priority: 100

Proactive Preemption: ☐ Enable

Preemption Delay: 300 secs

Virtual IP Addresses

Interface	Virtual IP/Netmask	Virtual MAC	Operation

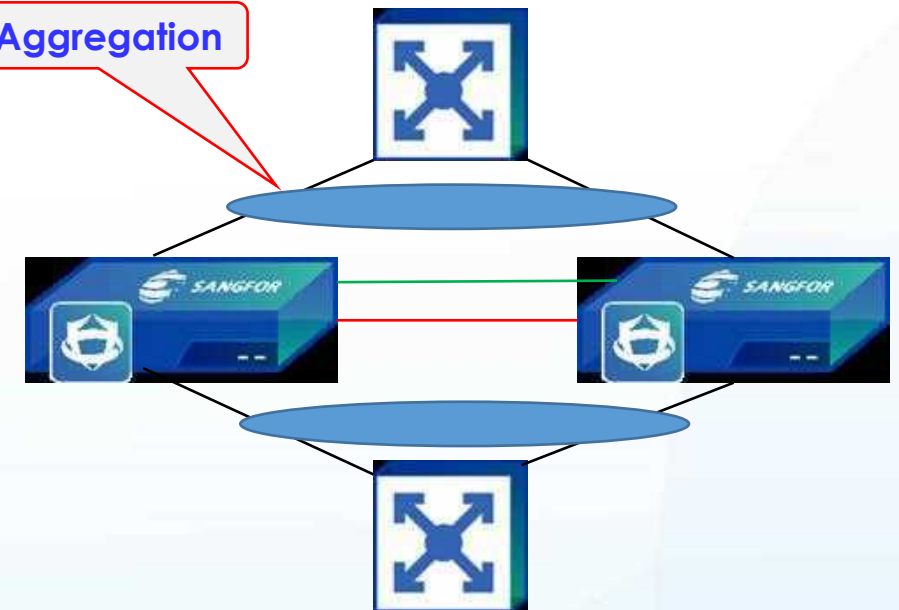
Link Aggregation

- Link aggregation is mainly used in the active/active as well as layer-2 mode scenario, where link aggregation is performed on the uplink and downlink devices and traffic exists inconsistent path. After enabling this feature, each NSF will automatically generate identifier (either 0 or 1) in backend. This identifier is not visible on the web page.
- All traffic passing through the interfaces of the internal and external network areas in the NSF link aggregation configuration will be processed by an algorithm based on the source or destination IP addresses. The algorithm determines whether the computed value is 0 or 1, and forwards the corresponding data packet to specific NSF by corresponding identifier (e.g., if the computed value is 0, the data will be forwarded to the NSF with the identifier 0).

← | HA Policy Settings

HA Policy:	<input checked="" type="checkbox"/> Enable
Mode:	<input type="radio"/> Active/Standby <input checked="" type="radio"/> Active/Active
Device Name:	HQ-NGAF
Control Link ⓘ:	eth5 Local 172.16.99.5
Data Link ⓘ:	Optional Local Select
Layer 2 Mode ⓘ:	<input checked="" type="checkbox"/> Enable
HA Traffic:	<input type="checkbox"/> Enable ⓘ
Link Aggregation ⓘ:	Settings

Link Aggregation



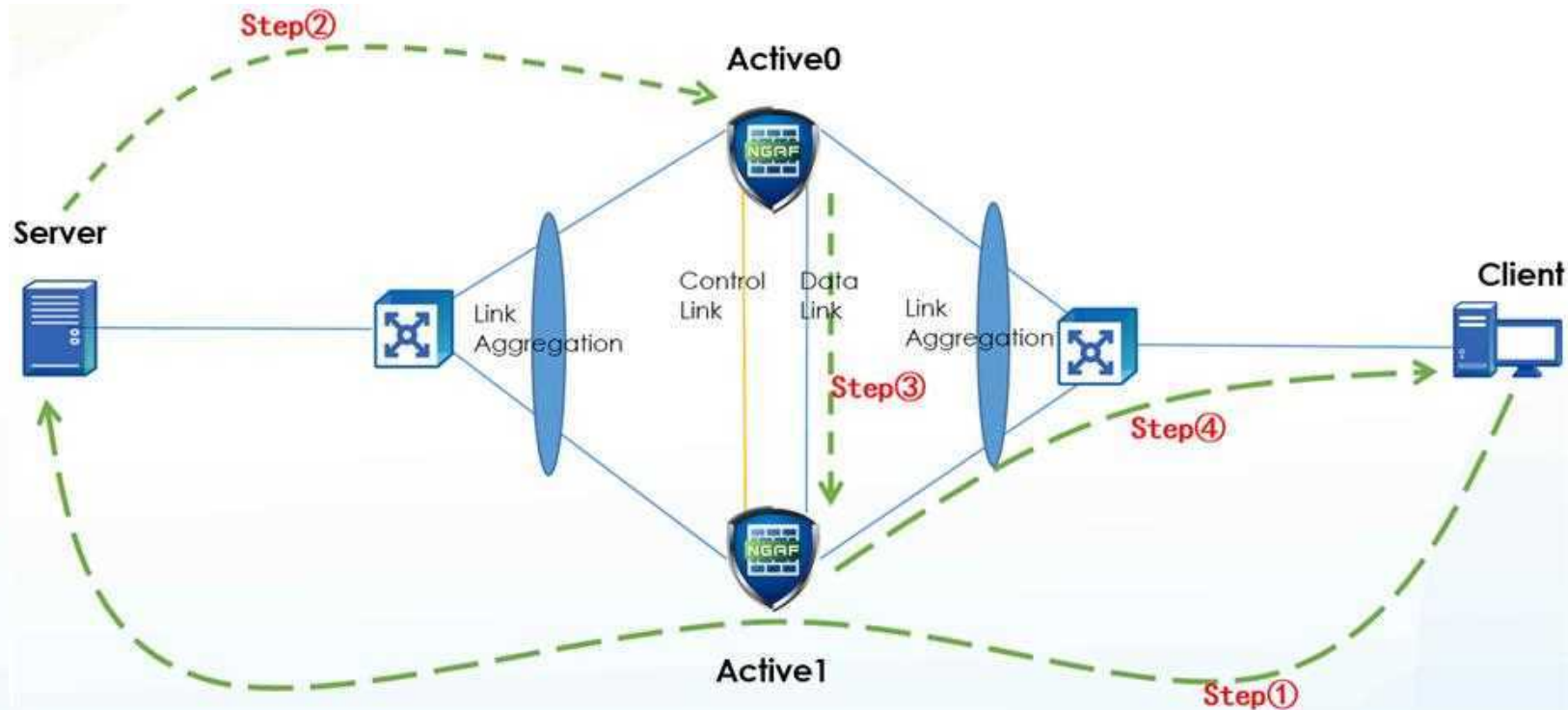
The work flow is as below:

Step① : Client traffic accessing the server passes through Active1 device. Active1 performs detection by hash algorithm. Once the detection is completed, the data packet is forwarded from Active1 to the server.

Step② : The server returns the data packet, which arrives at Active0 by link aggregation.

Step③ : Active 0 calculates the hash algorithm to determine it needs to be further checked by Active1. Same destination address yields the same calculation result as before, the data packet is forwarded to Active1 via the data link.

Step④ : Active 1 returns the data packet to the Client.

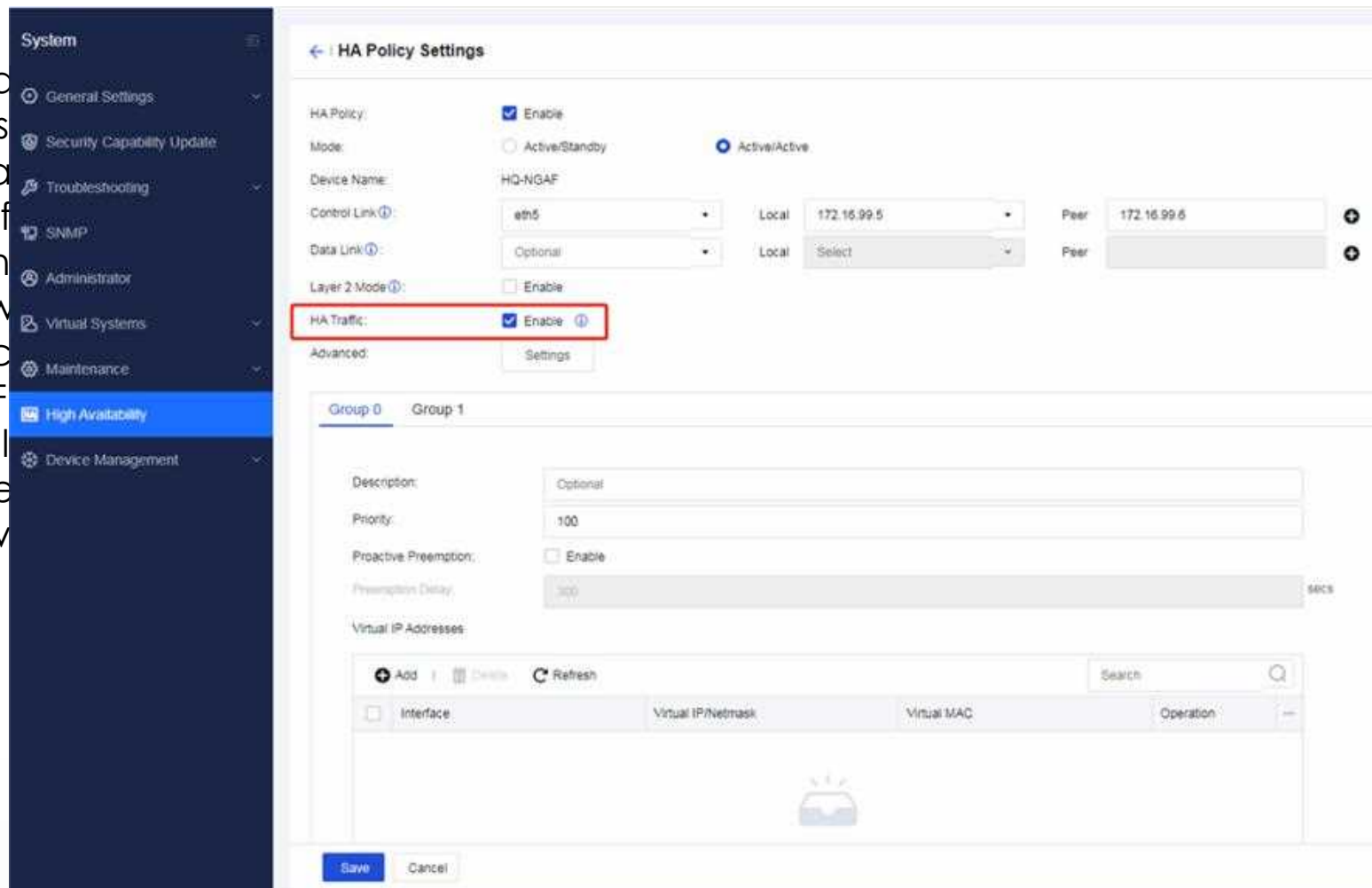


HA traffic function is only used for asymmetric traffic occasion, if not, there is no need to turn it on since this function will consume extra performance. HA traffic function is only applicable to below 2 deployment scenarios.

- **Scenario 1:** Active/Active with Virtual Wire Mode as well as enabling link aggregation function(if link aggregation function is not enabled, HA traffic will not take effect);
- **Scenario 2:** Active/Active with Layer-3 Mode;

HA Traffic

- The function is used when there exists inconsistency in wire mode. “HA Traffic”
- After enabling this function, some packets are sent to the peer device in one flow and ineffective security
- Once the peer NSF interface, and the local uplink device's layer 2 helps prevent network



The screenshot shows the 'HA Policy Settings' page in the Sangfor management console. The left sidebar contains a 'System' menu with options like General Settings, Security Capability Update, Troubleshooting, SNMP, Administrator, Virtual Systems, Maintenance, High Availability (highlighted), and Device Management. The main content area is titled 'HA Policy Settings' and includes the following configuration options:

- HA Policy:** ☒ Enable
- Mode:** ☐ Active/Standby ☒ Active/Active
- Device Name:** HQ-NGAF
- Control Link:** eth5 (Local: 172.16.99.5, Peer: 172.16.99.6)
- Data Link:** Optional (Local: Select, Peer:)
- Layer 2 Mode:** ☐ Enable
- HA Traffic:** ☒ Enable (highlighted with a red box)
- Advanced:** Settings

Below these settings, there are tabs for 'Group 0' and 'Group 1'. The 'Group 0' tab is active, showing fields for Description (Optional), Priority (100), Proactive Preemption (Enable), Preemption Delay (300 secs), and Virtual IP Addresses. At the bottom, there is a table with columns: Interface, Virtual IP/Netmask, Virtual MAC, and Operation. The table is currently empty. At the bottom of the page, there are 'Save' and 'Cancel' buttons.



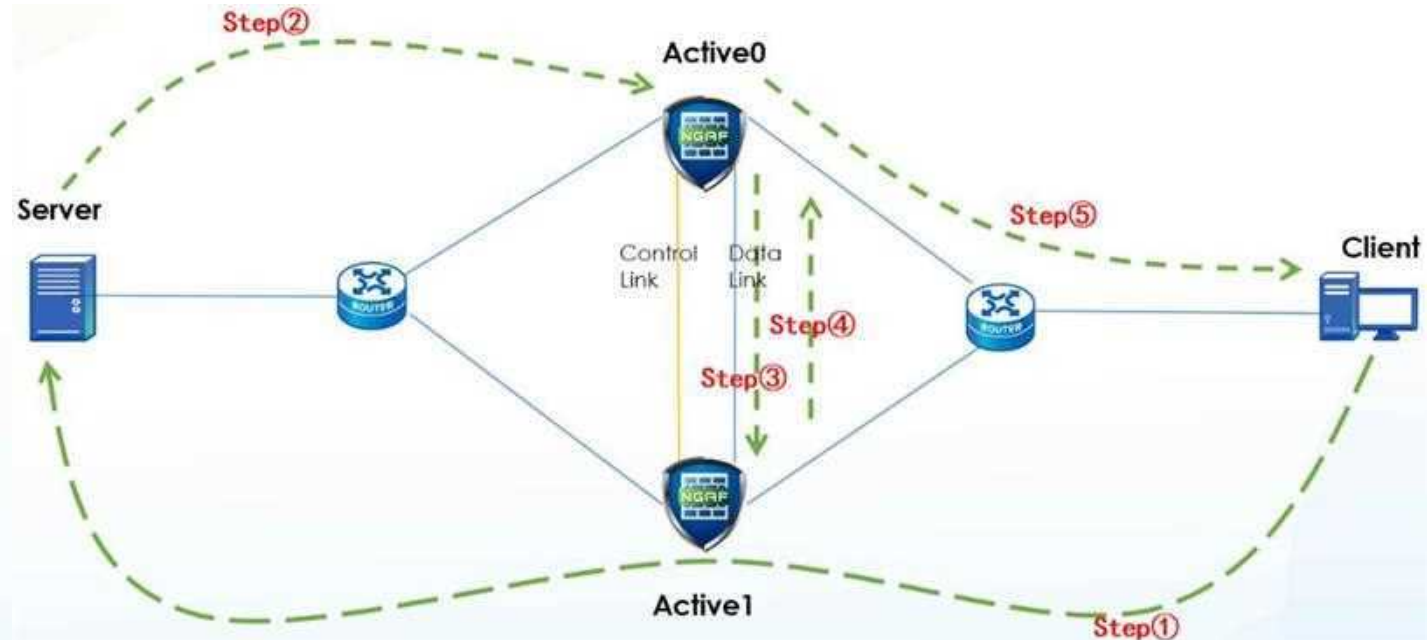
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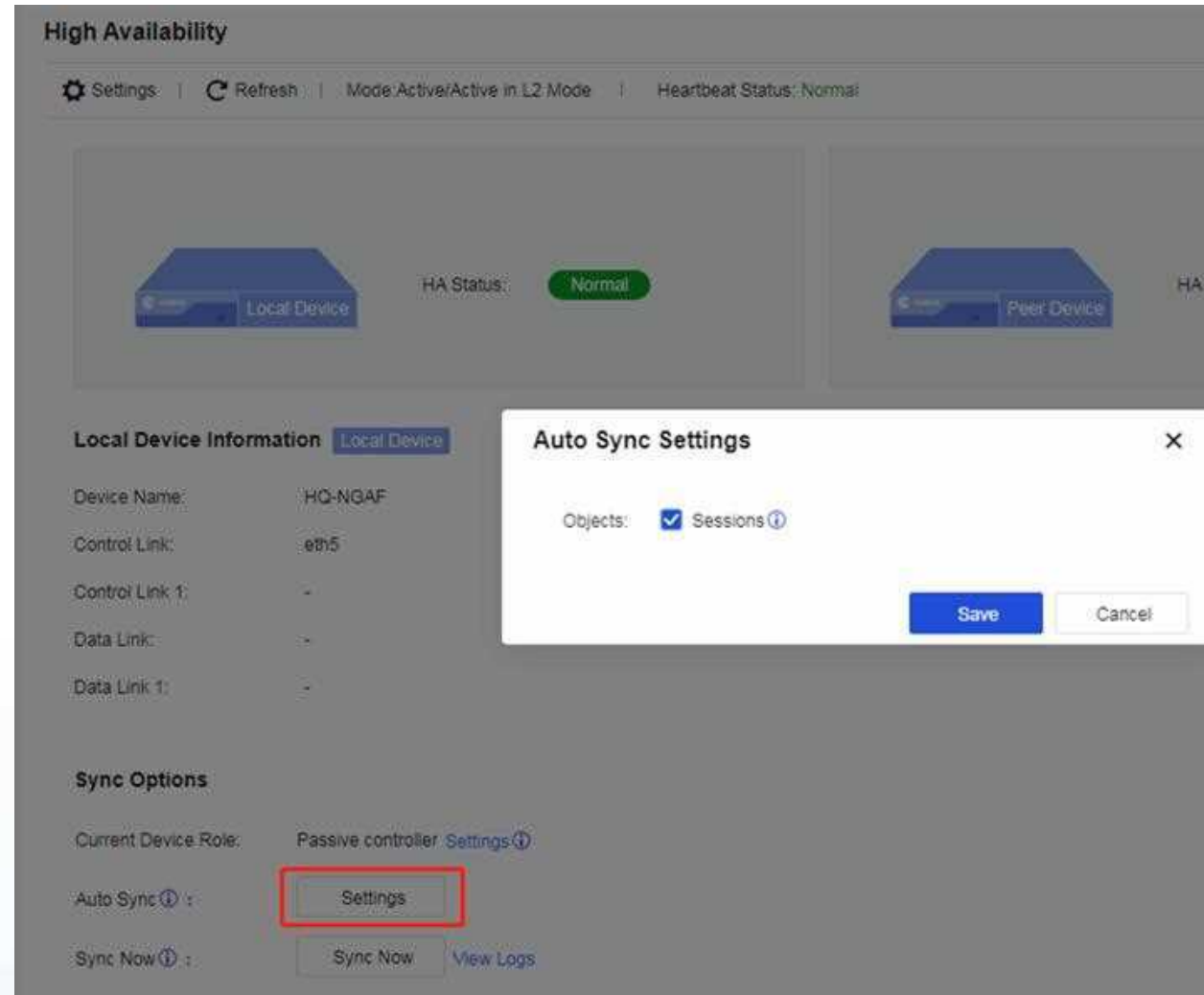
The specific workflow when enabling both link aggregation and HA traffic features in active/active with virtual wire mode is as follows:

- Step①** : Client traffic accessing the server goes through Active 1. Active 1 performs detection by hash algorithm on the traffic, and upon completion of the detection, forwards it to the server.
- Step②** : The server returns the traffic, which reaches Active 0.
- Step③** : Active 0 applies the hash algorithm to determine that Active 1 should perform the detection (calculating the same result for the same address). It forwards the packets to Active 1 through the data link.
- Step④** : After receiving the packets, Active 1 completes the detection and forwards them back to Active 0 through the data link.
- Step⑤** : Active 0 returns the packets to the client..



Synchronization Objects

You are able to edit synchronization objects in the setting of “Auto Sync”, and currently there is only sessions which can be selected.



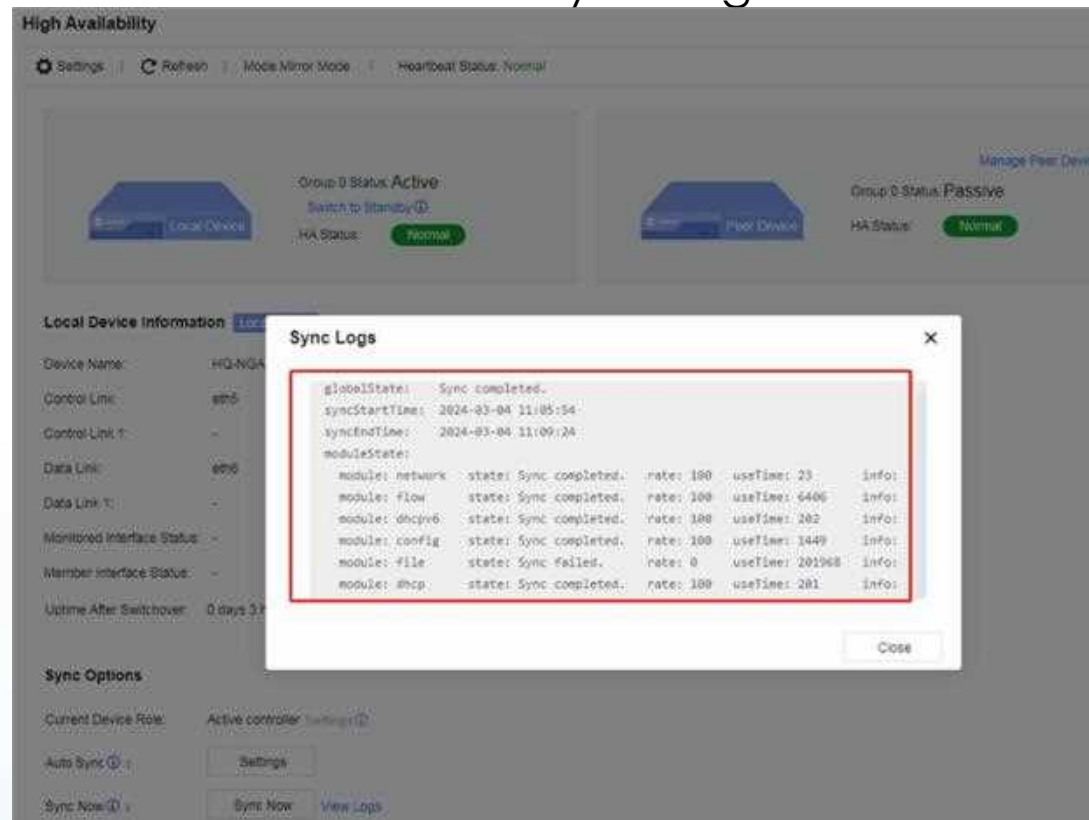
Sessions are synchronized by data link interface in usual, and if there is no data link, which can be synchronized by control link interface. There are several types of synchronization methods, they are respectively as below.

Types of Synchronization	Description
Real-time synchronization	This mainly contains sessions and is triggered as session establishment, deletion, modification and adding.
Manual synchronization	You are able to trigger it manually in web panel.
Scheduled synchronization	In backend, there exists scheduled synchronization from one NSf to another.
Full synchronization	This always happened when suffered switchover.

Note:

- As for parent-child link in the process of session synchronization, such as control channel and data channel in FTP application, parent link will be synchronized firstly and then child link.
- There are some exception which are not synchronized, such as local host sessions, sessions of ICMP, and deleted sessions when interfaces turned down.

- After both NSF have been configured control link and data link interfaces, “Hello” packet determine which one is active and which one is standby.
- After negotiation process finishes, active NSF will synchronize configuration information, such as business configuration, interfaces configuration etc. to standby NSF.
- If new configuration is executed in active NSF, it will automatically synchronize to standby one, however there is no chance to delivery configuration in reverse process.



High availability switchover depends on a serial of elements, such as proactive preemption, device failure value, monitoring objects failure value, configuration priority, and real-time priority. Details of switchover delay can be referred as below.

Cause of Switchover	Switchover Delay
Modify NSF priority in proactive preemption mode	1 heartbeat cycle
Break down of monitoring interfaces	no delay
Link monitoring detection failure	no delay
NSF power off or whole NSF break down	3 heartbeats cycle

Configuration Priority: Configure in web panel

System

General Settings

Security Capability Update

Troubleshooting

SNMP

Administrator

Virtual Systems

Maintenance

High Availability

Device Management

HA Policy Settings

HA Policy:

☒ Enable

Mode:

☒ Active/Standby

☐ Active/Active

Device Name:

HQ-NGAF

Control Link

eth5

Local

172.16.99.5

Peer

172.16.99.6

Data Link

eth6

Local

172.16.98.5

Peer

172.168.98.6

Mirror Mode

☒ Enable

Advanced:

Settings

Group 0

Description:

Optional

Priority:

200

Proactive Preemption:

☐ Enable

Preemption Delay:

300

secs

Monitored Object Management:

Manage

Monitored Object

Select (optional)

■ Device failure value and monitoring objects failure value

By default the failure value of interface monitoring and link monitoring are 255 and device failure value is 0. Either interface monitoring or link monitoring happened to failure, device failure value will increase from default 0 to 255.

■ Real-time Priority

Real-time priority = configuration priority - device failure value

Note: The minimal value of real-time priority is “0”, and never be a negative number. For example if configuration priority is 100, and currently device failure value is 255, real-time priority value then is “0”

■ Proactive Preemption

Group 0

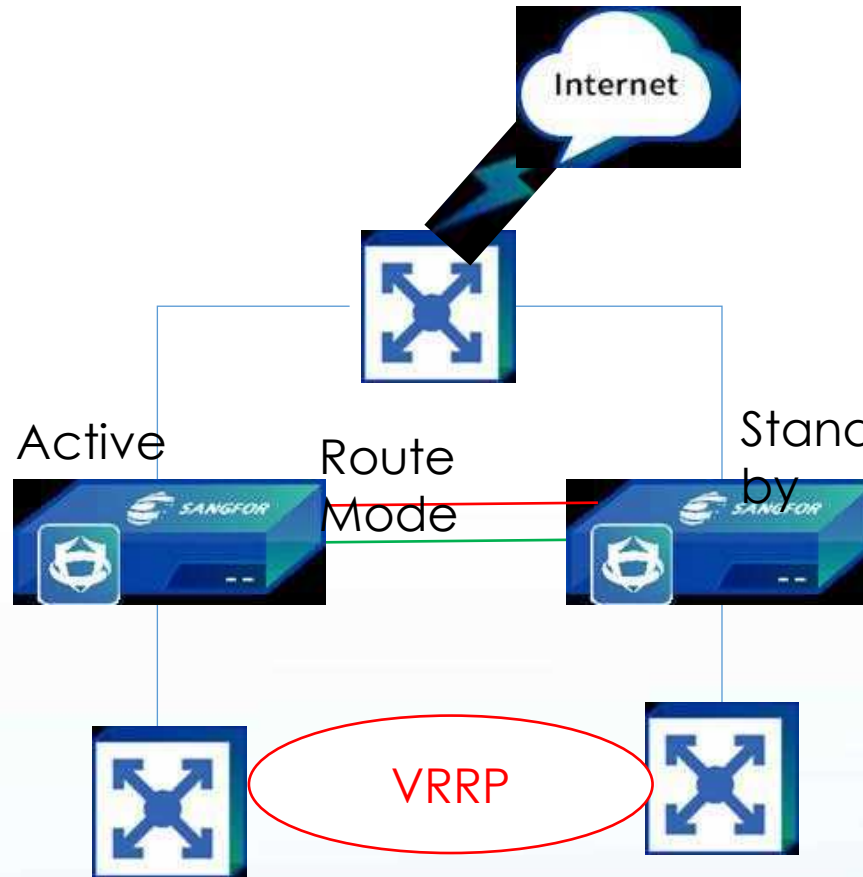
Description:	Optional
Priority:	200
Proactive Preemption:	<input checked="" type="checkbox"/> Enable
Preemption Delay:	300 secs
Monitored Object Management:	Manage
Monitored Object ⓘ:	Select (optional) ▼

PART 2

Types of High Availability

Active/Standby Mode

Only active NSF forwards traffic, standby NSF doesn't in Active/Standby mode. Only active NSF will issue virtual IP to uplink and downlink devices. When active NSF suffers failure, there will trigger switchover, and then virtual IP will be issued by latest active NSF. The configuration cannot be edited once NSF is elected as standby role.



Active/Standby with Mirror Mode



The real IP forwards traffic replacing virtual IP, when compared with Active/Standby mode. Except from OOBM interface, control link interface and data link interface, the rest interfaces information will be synchronized from active NSF to standby NSF, including MAC addresses.

The screenshot displays the Sangfor NSM configuration interface. On the left, the 'Physical Interfaces' tab is active, showing a table of interfaces. On the right, the 'HA Policy Settings' tab is active, showing configuration options for High Availability (HA) Policy.

Physical Interfaces Table:

Interface Name	Interface Status	WAN Attribute	Type
eth0	OOBM	No	La
eth1		Yes	La
eth2		No	La
eth3		No	La
eth4		No	La
eth5		No	La
eth6		No	La

HA Policy Settings:

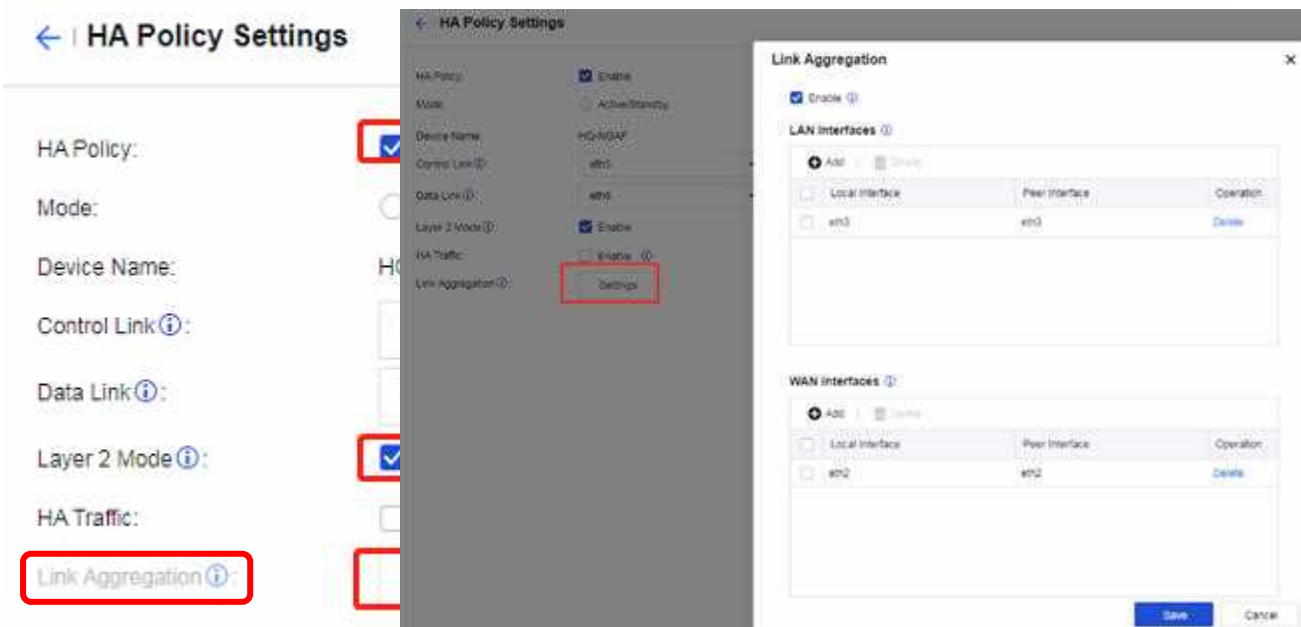
- HA Policy: ☒ Enable
- Mode: ☒ Active/Standby ☐ Active/Active
- Device Name: HQ-NGAF
- Control Link: eth5 Local: 172.16.99.5 Peer: 172.16.99.6
- Data Link: eth6 Local: 172.16.98.5 Peer: 172.168.98.6
- Mirror Mode: ☒ Enable
- Advanced: Settings

Group 0:

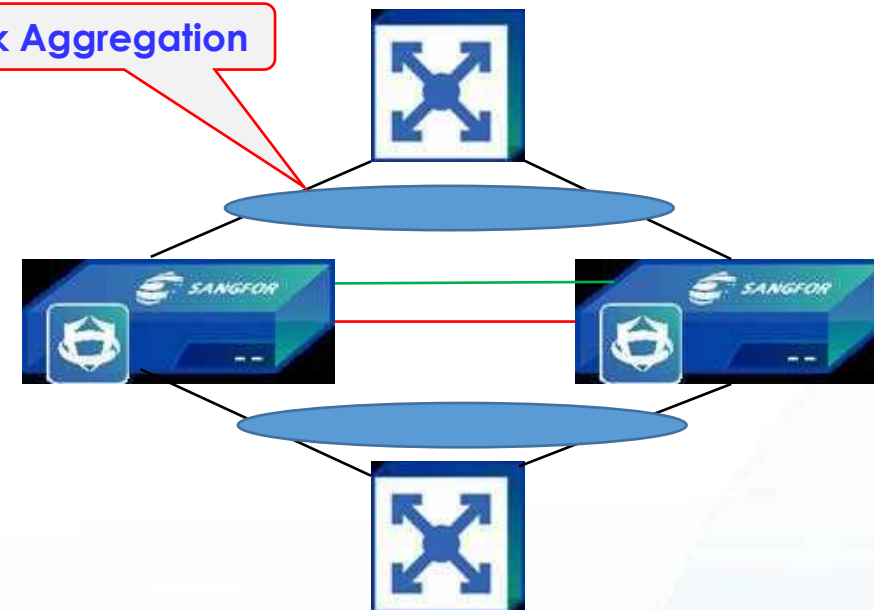
- Description: Optional
- Priority: 200
- Proactive Preemption: ☐ Enable
- Preemption Delay: 300 secs
- Monitored Object Management: Manage
- Monitored Object: Select (optional)

Active/Active with Virtual Wire Mode

There is no group 0 nor group 1 in Active/Active with layer-2 mode. If there exists inconsistent traffic, you are required to turn on “**Link Aggregation**” function to guarantee normal forwarding.



Link Aggregation

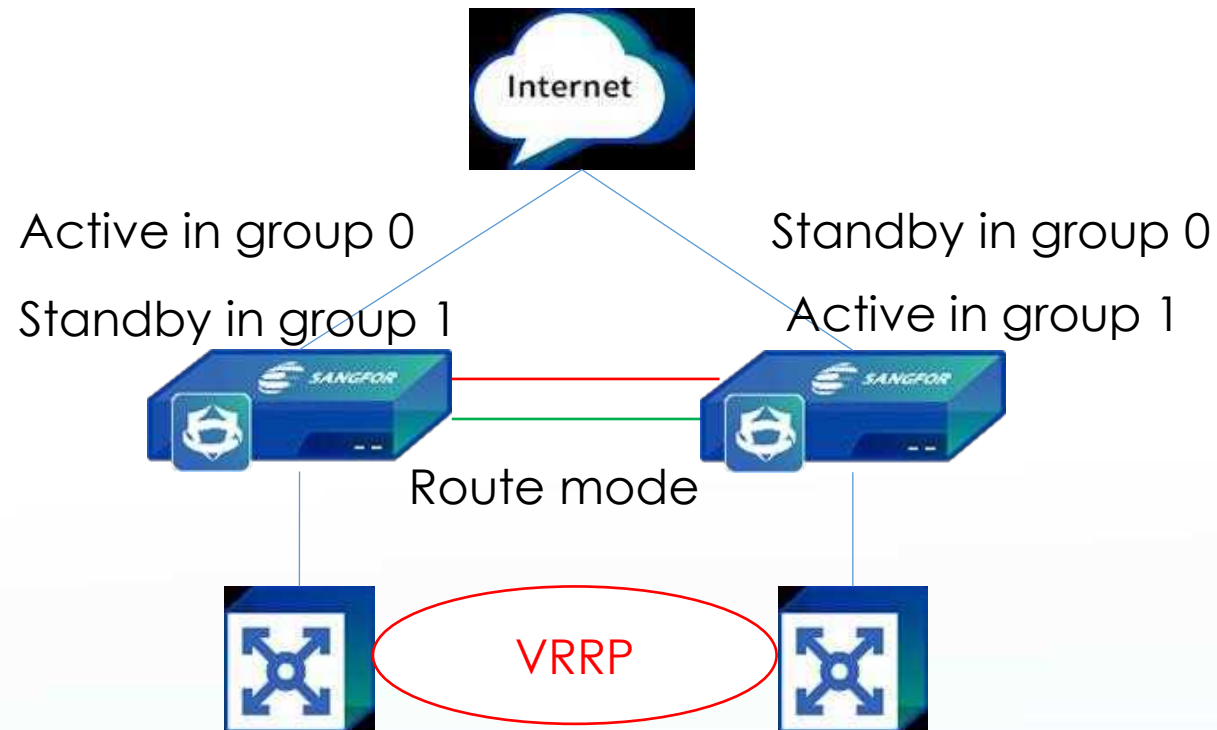


Requirements:

1. HA policy is enabled.
2. The HA mode is active/active and Layer 2 mode is enabled.
3. Data sync interface is configured.
4. At least 2 available Layer-2 interfaces are required.

Active/Active with Layer-3 Mode

Active/Active with layer-3 mode is mainly used for scenario that one NSF undertakes too much due to large size of traffic, requiring another NSF to load balance. In this mode, both NSF forward traffic as well as behave the relation between active and backup in different group.



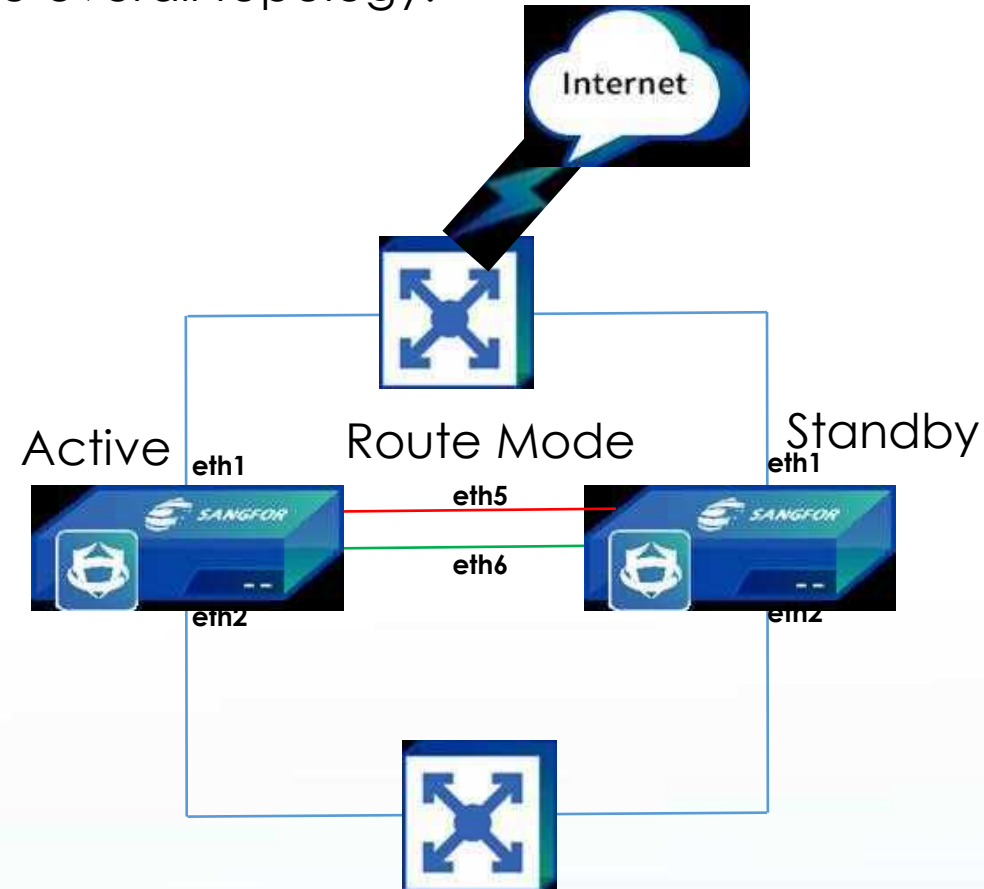
PART 3

Case Study of High Availability

Case 1: Active/Standby with Mirror Mode

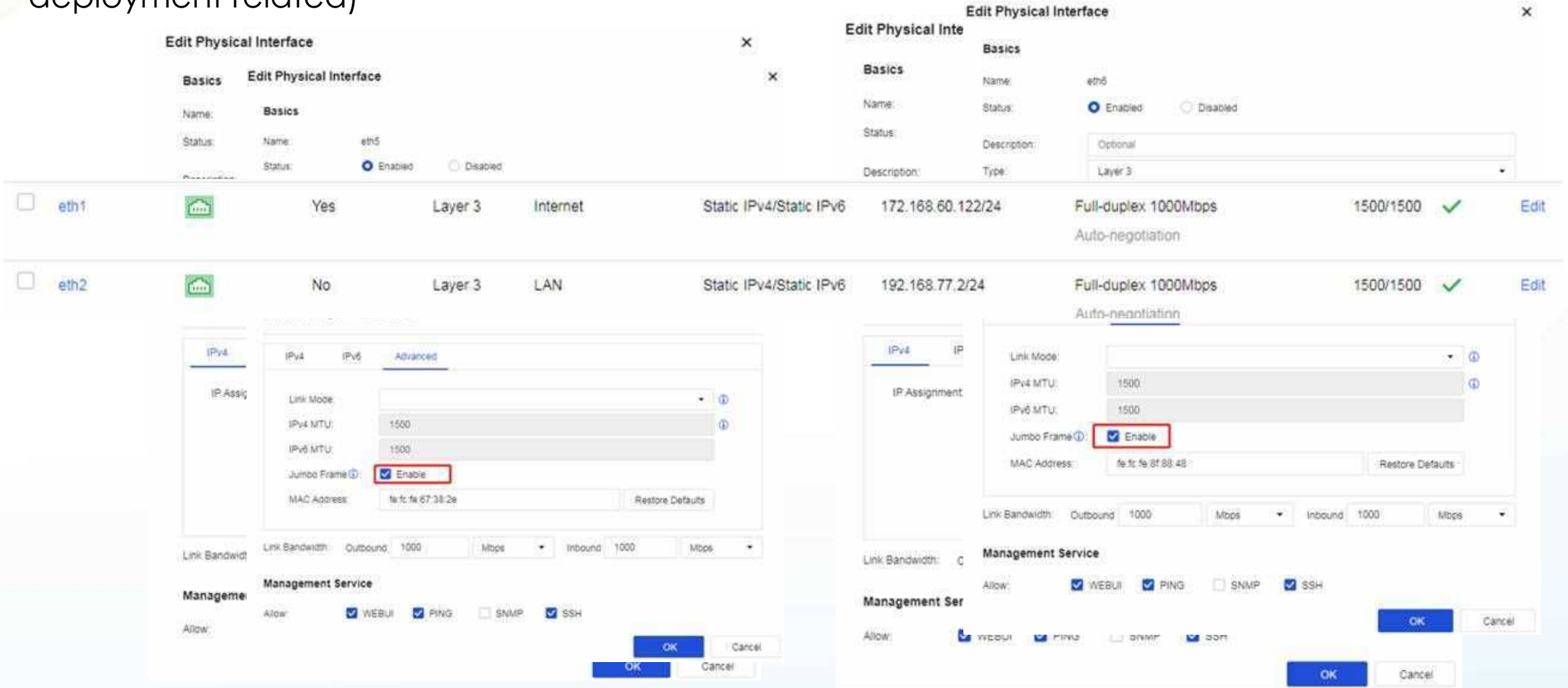


A customer now purchase 2 NSF to deploy current network and require NSF provide high availability. Below is the overall topology.



Case 1: Active/Standby with Mirror Mode

In expected active NSF, configure network and interfaces(ignore security policy and deployment related)



The screenshot displays the Sangfor firewall configuration interface, specifically the 'Edit Physical Interface' window. It shows two interfaces, eth1 and eth2, with their respective configurations. Below the interface list, two detailed views are shown: the 'Advanced' tab for eth1 and the 'Management Service' tab for eth2.

Interface	Status	Mode	Type	IP Assignment	IP Address	Speed	MTU
eth1	Yes	Layer 3	Internet	Static IPv4/Static IPv6	172.168.60.122/24	Full-duplex 1000Mbps	1500/1500
eth2	No	Layer 3	LAN	Static IPv4/Static IPv6	192.168.77.2/24	Full-duplex 1000Mbps	1500/1500

Advanced Tab (eth1):

- Link Mode:
- IPv4 MTU: 1500
- IPv6 MTU: 1500
- Jumbo Frame: ☒ Enable
- MAC Address: fa:fc:fa:67:38:2e
- Link Bandwidth: Outbound 1000 Mbps, Inbound 1000 Mbps

Management Service (eth2):

- Allow: ☒ WEBUI, ☒ PING, ☐ SNMP, ☒ SSH

Case 1: Active/Standby with Mirror Mode

In expected standby NSF, configure network and interfaces.

Edit Physical Interface x

Basics

Name: eth5

Status: ☒ Enabled ☐ Disabled

Description: Optional

Type: Layer 3

Zone: Control-Link

Basic Attributes: ☐ WAN attribute

Reverse Routing ⓘ: ☐ Enabled

IPv4 IPv6 Advanced

IP Assignment: ☒ Static ☐ DHCP ☐ PPPoE

Static IP: 172.16.99.6/24 ⓘ

Default Gateway:

Link Bandwidth: Outbound 1000 Mbps Inbound 1000 Mbps

Management Service

Allow: ☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

OK Cancel

Edit Physical Interface x

Basics

Name: eth6

Status: ☒ Enabled ☐ Disabled

Description: Optional

Type: Layer 3

Zone: Data-Link

Basic Attributes: ☐ WAN attribute

Reverse Routing ⓘ: ☐ Enabled

IPv4 IPv6 Advanced

IP Assignment: ☒ Static ☐ DHCP ☐ PPPoE

Static IP: 172.16.98.6/24 ⓘ

Default Gateway:

Link Bandwidth: Outbound 1000 Mbps Inbound 1000 Mbps

Management Service

Allow: ☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

OK Cancel

Case 1: Active/Standby with Mirror Mode

In expected active NSF, configure setting of high availability.

← HA Policy Settings

HA Policy: ☒ Enable ☐ Disable

Mode: ☒ Active/Standby ☐ Active/Active

Device Name: HQ-NGAF

Control Link ①: eth5

Data Link ①: eth6

Mirror Mode ①: ☒ Enable ☐ Disable

Advanced: Settings

Group 0

Description: Optional

Priority: 200

Proactive Preemption: ☐ Enable

Preemption Delay: 300

Monitored Object Management: Manage

Monitored Object ①: Select (optional)

Monitored Object Management

Monitored objects are managed here so that they can be directly referenced when the user configure the HA policy.

Interface Monitoring Link Monitoring

+ Add | Delete Refresh

<input type="checkbox"/>	Group Name	Interface	Failure Trigger	Operation	...
<input type="checkbox"/>	business interface	eth1,eth2	One fails	Edit Delete	

Save Cancel

Case 1: Active/Standby with Mirror Mode

In expected standby NSF, configure setting of high availability.

← HA Policy Settings

HA Policy:

☒ Enable

Mode:

☒ Active/Standby

☐ Active/Active

Device Name:

NSF

Control Link ①:

eth5

Local

172.16.99.6

Peer

172.16.99.5

+

Data Link ①:

eth6

Local

172.16.98.6

Peer

172.16.98.5

+

Mirror Mode ①:

☒ Enable

Advanced:

Settings

Group 0

Description:

Optional

Priority:

100

Proactive Preemption:

☐ Enable

Preemption Delay:

300

secs

Monitored Object Management:

Manage

Monitored Object ①:

Select (optional)

Case 1: Active/Standby with Mirror Mode

After high availability is established successfully, it will display below status.

High Availability

Settings Refresh Mode: Mirror Mode Heartbeat Status: Normal

This node is in secondary sync role and configurations cannot be changed via it.



Local Device Information Local Device

Device Name: HQ-NGAF
Control Link: eth5
Control Link 1: -
Data Link: eth6
Data Link 1: -
Monitored Interface Status: -
Member Interface Status: -
Uptime After Switchover: 0 days 6 hrs 21 mins [View Switchover Information](#)

Active NSF

High Availability

Settings Refresh Mode: Mirror Mode Heartbeat Status: Normal



Local Device Information Local Device

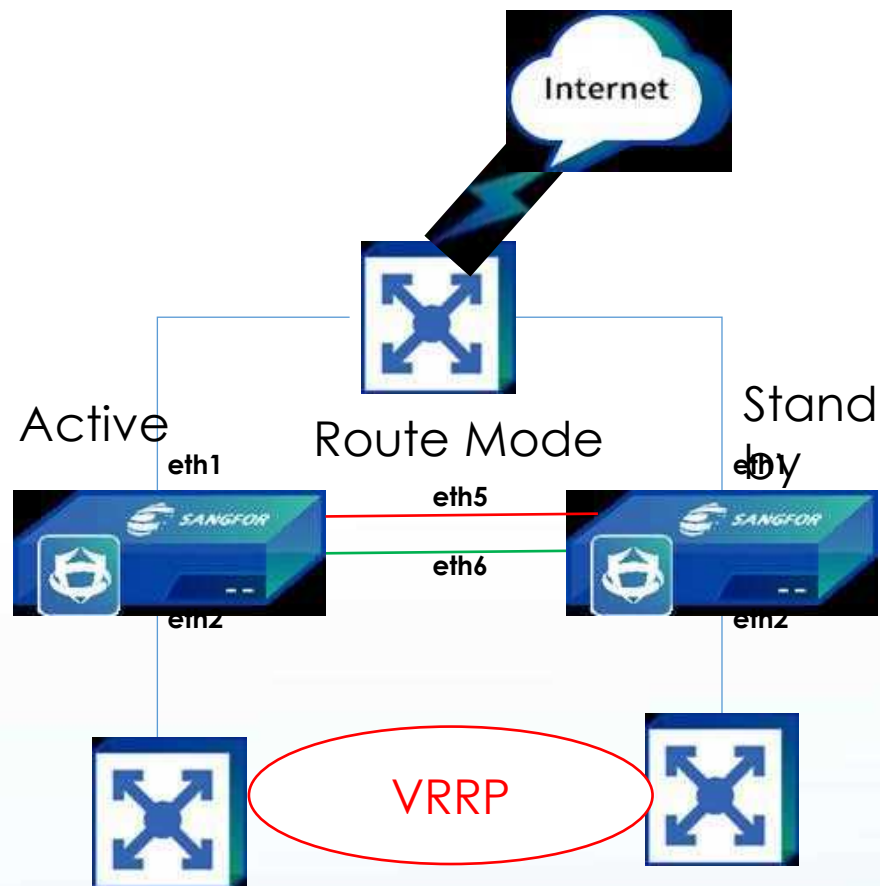
Device Name: NSF
Control Link: eth5
Control Link 1: -
Data Link: eth6
Data Link 1: -
Monitored Interface Status: -
Member Interface Status: -
Uptime After Switchover: 0 days 6 hrs 10 mins [View Switchover Information](#)

Standby NSF



Case 2: Active/Standby Mode

A customer's internal network is based on VRRP protocol, now customer purchased 2 NSF to deploy current network and require NSF provide high availability. Below is the overall topology.



Case 2: Active/Standby Mode



In expected active NSF, configure network and interfaces(ignore security policy and deployment related)

Edit | Edit Physical Interface

Ba Basics

Na Name:

eth5

Sta Status:

☒ Enabled ☐ Disabled

De Description:

Optional

<input type="checkbox"/>	eth1		Yes	Layer 3	Internet	Static IPv4/Static IPv6	172.168.60.122/24	Full-duplex 1000Mbps	1500/1500	✓	Edit
Auto-negotiation											
<input type="checkbox"/>	eth2		No	Layer 3	LAN	Static IPv4/Static IPv6	192.168.77.2/24	Full-duplex 1000Mbps	1500/1500	✓	Edit
Auto-negotiation											

IPv4

IPv6

Advanced

Link Mode:

IPv4 MTU:

1500

IPv6 MTU:

1500

Jumbo Frame

☒ Enable

MAC Address:

fe:fc:fe:67:38:2e

Restore Defaults

Link Bandwidth:

Outbound

1000

Mbps

Inbound

1000

Mbps

Ma Management Service

Allow:

☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

OK

Cancel

Edit | Edit Physical Interface

Ba Basics

Na Name:

eth6

Sta Status:

☒ Enabled ☐ Disabled

De Description:

Optional

Typ Type:

Layer 3

<input type="checkbox"/>	eth1		Yes	Layer 3	Internet	Static IPv4/Static IPv6	172.168.60.122/24	Full-duplex 1000Mbps	1500/1500	✓	Edit
Auto-negotiation											
<input type="checkbox"/>	eth2		No	Layer 3	LAN	Static IPv4/Static IPv6	192.168.77.2/24	Full-duplex 1000Mbps	1500/1500	✓	Edit
Auto-negotiation											

Link Mode:

IPv4 MTU:

1500

IPv6 MTU:

1500

Jumbo Frame

☒ Enable

MAC Address:

fe:fc:fe:8f:88:48

Restore Defaults

Link Bandwidth:

Outbound

1000

Mbps

Inbound

1000

Mbps

Ma Management Service

Allow:

☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

OK

Cancel

Case 2: Active/Standby Mode

In expected standby NSF, configure network and interfaces.

×

Edit Physical Interface

Basics


Name: eth5

Status: ☒ Enabled ☐ Disabled

Description: Optional

Type: Layer 3

eth1



Yes

Layer 3

Internet

Static IPv4/Static IPv6

172.168.60.123/24


Full-duplex 1000Mbps

1500/1500

✓

☐

eth2



No

Layer 3

LAN

Static IPv4/Static IPv6

192.168.77.3/24

Full-duplex 1000Mbps

1500/1500

✓

Static IP: 172.16.99.6/24

Default Gateway:

Link Bandwidth: Outbound 1000 Mbps Inbound 1000 Mbps

Management Service

Allow: ☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

OK

Cancel

×

Edit Physical Interface

Basics


Name: eth6

Status: ☒ Enabled ☐ Disabled

Description: Optional

Type: Layer 3

eth1



Yes

Layer 3

Internet

Static IPv4/Static IPv6

172.168.60.123/24


Full-duplex 1000Mbps

1500/1500

✓

☐

eth2



No

Layer 3

LAN

Static IPv4/Static IPv6

192.168.77.3/24

Full-duplex 1000Mbps

1500/1500

✓

Static IP: 172.16.98.6/24

Default Gateway:

Link Bandwidth: Outbound 1000 Mbps Inbound 1000 Mbps

Management Service

Allow: ☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

OK

Cancel

Sangfor Technologies

Page 38

Case 2: Active/Standby Mode

In expected active NSF, configure setting of high availability.

← HA Policy Settings

HA Policy:

☒ Enable

Mode:

Device Name:

Control Link ⓘ:

Data Link ⓘ:

Mirror Mode ⓘ:

Advanced:

Group 0

Description:

Priority:

Proactive Preem

Preemption Del

Virtual IP Addre

☒ Add

☐ Interface

☐ eth1

☐ eth2

Virtual IP Addresses

+ Add

Delete

Refresh

☐ Interface

☐ eth1

☐ eth2

Virtual

172.16

192.16

Monitored Object Management:

Manage:

Monitored Object ⓘ:

business interface

Save

Cancel

Monitored Object Management

×

Monitored objects are managed here so that they can be directly referenced when the user configure the HA policy.

Interface Monitoring

Link Monitoring

+ Add

Delete

Refresh

<input type="checkbox"/>	Group Name	Interface	Failure Trigger	Operation	...
<input type="checkbox"/>	business interface	eth1,eth2	One fails	Edit Delete	

Save

Cancel

Case 2: Active/Standby Mode

In expected standby NSF, configure setting of high availability.

← HA Policy Settings

HA Policy:

Mode:

Device Name:

Control Link:

Data Link:

Mirror Mode:

Advanced:

Group 0

Description:

Priority:

Proactive Preemption:

Preemption Delay:

Virtual IP Addresses

+ Add | Delete

☐ Interface

☐ eth1

☐ eth2

Preemption Delay:

300

Virtual IP Addresses

+ Add | Delete | Refresh

☐ Interface

Virtual

☐ eth1

172.1

☐ eth2

192.1

Monitored Object Management:

Manage

Monitored Object:

business interface

Save

Cancel

Monitored Object Management

×

Monitored objects are managed here so that they can be directly referenced when the user configure the HA policy.

Interface Monitoring

Link Monitoring

+ Add | Delete | Refresh

<input type="checkbox"/>	Group Name	Interface	Failure Trigger	Operation	...
<input type="checkbox"/>	business interface	eth1,eth2	One fails	Edit Delete	

Save

Cancel

Case 2: Active/Standby Mode

The successful high availability status is shown as below.

High Availability

Settings | Refresh | Mode: Active/Standby | Heartbeat Status: Normal



Local Device Information Local Device

Device Name: HQ-NGAF
Control Link: eth5
Control Link 1: -
Data Link: eth6
Data Link 1: -
Monitored Interface Status: Normal
Member Interface Status: -
Uptime After Switchover: 0 days 0 hrs 5 mins [View Switchover Information](#)

Sync Options

Current Device Role: Active controller [Settings ⓘ](#)
Auto Sync ⓘ: [Settings](#)
Sync Now ⓘ: [Sync Now](#) [View Logs](#)

Active NSF

ⓘ This node is in secondary sync role and configurations cannot be changed via it.

High Availability

Settings | Refresh | Mode: Active/Standby | Heartbeat Status: Normal



Local Device Information Local Device

Device Name: NSF
Control Link: eth5
Control Link 1: -
Data Link: eth6
Data Link 1: -
Monitored Interface Status: Normal
Member Interface Status: -
Uptime After Switchover: 0 days 0 hrs 6 mins [View Switchover Information](#)

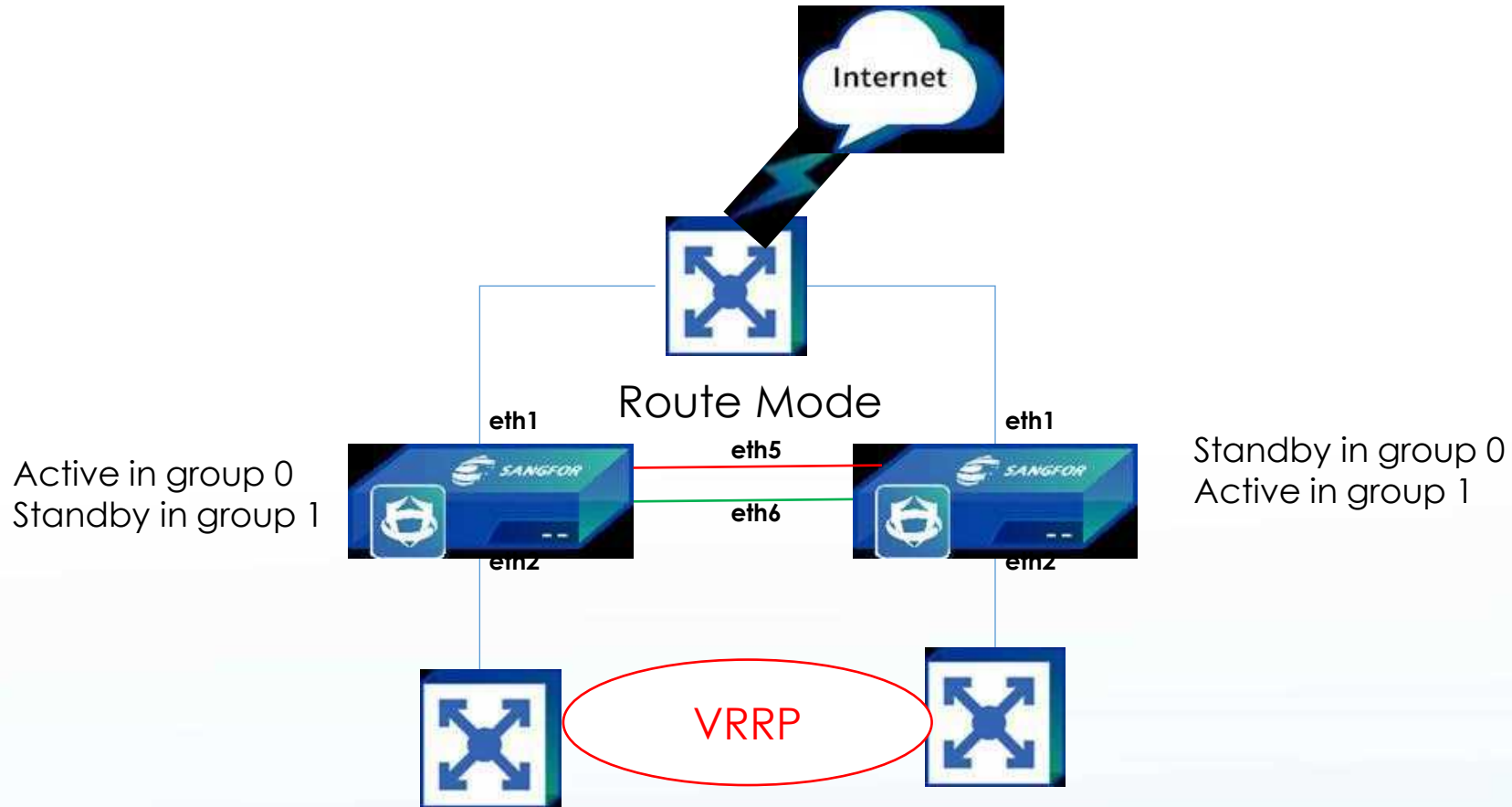
Sync Options

Current Device Role: Passive controller [Settings ⓘ](#)
Auto Sync ⓘ: [Settings](#)
Sync Now ⓘ: [Sync Now](#) [View Logs](#)

Standby NSF

Case 3: Active/Active with Layer-3 Mode

A customer purchase 2 NSF to be deployed in egress of enterprise network and they require to achieve active/active mode for traffic load balance, besides downlink core switches is based on VRRP protocol.



Case 3: Active/Active with Layer-3 Mode



The first NSF business and high availability interfaces are configured as below.

The screenshot displays the Sangfor network configuration interface. At the top, there are two overlapping 'Edit Physical Interface' windows. Below them is a table listing network interfaces.

Interface	Status	Mode	Type	IP Address	Speed	MTU	Link Mode
eth1	Enabled	Layer 3	Internet	Static IPv4/Static IPv6 172.168.60.122/24	Full-duplex 1000Mbps	1500/1500	✓
eth2	Enabled	Layer 3	LAN	Static IPv4/Static IPv6 192.168.77.2/24	Full-duplex 1000Mbps	1500/1500	✓

Below the table, there are two detailed configuration windows for 'eth1' and 'eth2'. Both windows show the 'Advanced' tab with the following settings:

- Link Mode: [Dropdown]
- IPv4 MTU: 1500
- IPv6 MTU: 1500
- Jumbo Frame: ☒ Enable
- MAC Address: fe:fc:fe:57:38:2e (for eth1) and fe:fc:fe:5f:88:48 (for eth2)
- Link Bandwidth: Outbound 1000 Mbps, Inbound 1000 Mbps
- Management Service: Allow WEBUI, PING, SSH

Case 3: Active/Active with Layer-3 Mode

It is necessary to configure link state propagation.

Physical Interfaces

Subinterfaces

VLAN Interfaces

Aggregate Interfaces

Local Loopback Interfaces

GRE Tunnels

Link State Propagation

☒ Enable link state propagation

+

Add

✕

Delete

↻

Refresh

<input type="checkbox"/>	Physical Interfaces	⇅	Operation	⋮
<input type="checkbox"/>	eth1, eth2		Edit	Delete

Case 3: Active/Active with Layer-3 Mode



In first NSF, configure setting of high availability.

← HA Policy Settings

HA Policy: **Group 0** **Group 1**

Mode:

Device Name: Description: Optional

Control Link ⓘ Priority: 200

Data Link ⓘ Proactive Preemption: ☒ Enable

Preemption Delay: 3

Layer 2 Mode

HA Traffic:

Advanced:

Virtual IP Addresses

+ Add | Delete Refresh

<input type="checkbox"/>	Interface	Virtual IP/Netmask
<input checked="" type="checkbox"/>	eth1	172.168.60.121/24
<input type="checkbox"/>	eth2	192.168.77.1/24

Monitored Object Management: Manage

Monitored Object ⓘ: business interface

Group 0 **Group 1**

Description: Optional

Priority: 100

Proactive Preemption: ☒ Enable

Preemption Delay: 3

Virtual IP Addresses

+ Add | Delete Refresh Search

<input type="checkbox"/>	Interface	Virtual IP/Netmask	Virtual MAC	Operation	...
<input type="checkbox"/>	eth1	172.168.60.124/24	00-00-5e-90-00-01	Edit Delete	
<input type="checkbox"/>	eth2	192.168.77.4/24	00-00-5e-90-00-02	Edit Delete	

Total: 2 < 1 > Entries Per Page 50 Go To Page 1

Monitored Object Management: Manage

Monitored Object ⓘ: business interface

Case 3: Active/Active with Layer-3 Mode



The second NSF business and high availability interfaces are configured as below.

The screenshot displays the configuration interface for two groups, Group 0 and Group 1, in a Layer-3 mode. Red boxes highlight specific configuration elements.

Group 0 Configuration:

- Description: Optional
- Priority: 100
- Proactive Preemption: ☒ Enable
- Preemption Delay: 3
- Virtual IP Addresses:

Interface	Virtual IP/Netmask
eth1	172.168.60.1
eth2	192.168.77.1
- Monitored Object Management: Manage
- Monitored Object: business interface

Group 1 Configuration:

- Description: Optional
- Priority: 200
- Proactive Preemption: ☒ Enable
- Preemption Delay: 3
- Virtual IP Addresses:

Interface	Virtual IP/Netmask	Virtual MAC	Operation
eth1	172.168.60.124/24	00-00-5e-90-00-01	Edit Delete
eth2	192.168.77.4/24	00-00-5e-90-00-02	Edit Delete
- Monitored Object Management: Manage
- Monitored Object: business interface

At the bottom of the interface are 'Save' and 'Cancel' buttons.

Case 3: Active/Active with Layer-3 Mode

The successful high availability status is shown as below.

High Availability

Settings Refresh Mode: Active/Active Heartbeat Status: Normal



Group 0 Status: Active
Switch to Standby ⓘ
Group 1 Status: Passive
HA Status: Normal

Local Device Information Local Device

Device Name: HQ-NGAF
Control Link: eth5
Control Link 1: -
Data Link: eth6
Data Link 1: -
Monitored Interface Status: Normal
Member Interface Status: -
Uptime After Switchover: 0 days 0 hrs 7 mins [View Switchover Information](#)

Sync Options

Current Device Role: Active controller [Settings ⓘ](#)
Auto Sync ⓘ : [Settings](#)
Sync Now ⓘ : [Sync Now](#) [View Logs](#)

First NSF

High Availability

Settings Refresh Mode: Active/Active Heartbeat Status: Normal



Group 0 Status: Passive
Group 1 Status: Active
Switch to Standby ⓘ
HA Status: Normal

Manage Peer Device

Group 0 Status: Active
Group 1 Status: Passive
HA Status: Normal

Local Device Information Local Device

Device Name: NSF
Control Link: eth5
Control Link 1: -
Data Link: eth6
Data Link 1: -
Monitored Interface Status: Normal
Member Interface Status: -
Uptime After Switchover: 0 days 0 hrs 8 mins [View Switchover Information](#)

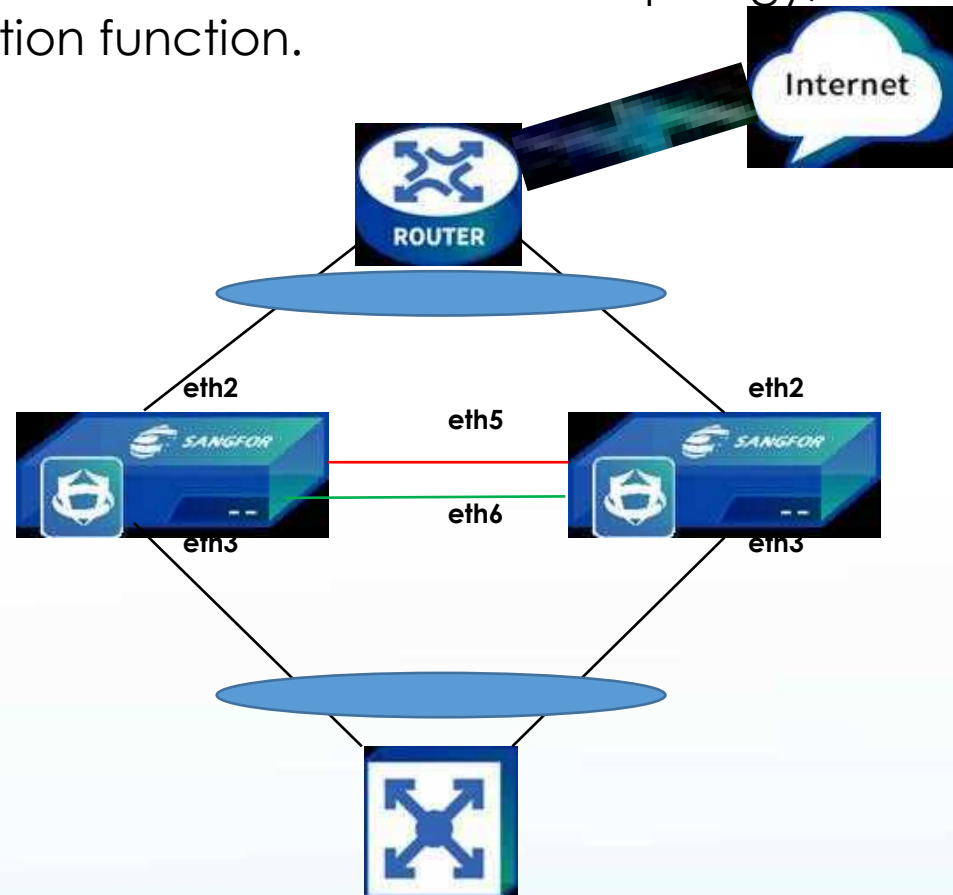
Sync Options

Current Device Role: Passive controller [Settings ⓘ](#)
Auto Sync ⓘ : [Settings](#)
Sync Now ⓘ : [Sync Now](#) [View Logs](#)

Second NSF

Case 4: Active/Active with Virtual Wire Mode

A customer's internal is connected by link aggregation from core switch to router. Now they purchase 2 NSF to be deployed in virtual wire mode between router and switch. Besides, 2 NSF need to work as active/active high availability mode. Given that there probably exists inconsistent business traffic in this topology, for 2 NSF it is necessary to configure link aggregation function.



Case 4: Active/Active with Virtual Wire Mode



In expected active controller NSF, business and high availability interfaces are configured as below.

Edit Physical Interface

Basics

Name: eth5

Status: ☒ Enabled

Description:

Type: ☐ eth2

Zone:

Basic At:

Reverse:

IP Assignment: ☒ Static

Static IP:

Default Gateway:

Link Bandwidth: Outbound 1000

Management Service

Allow: ☒ WEBUI ☒ PII

Edit Physical In

Basics

Name:

Status:

Description:

Type: ☒ eth2

Zone:

Basic At:

Reverse:

IP Assignment: ☒ Static

Static IP:

Default Gateway:

Link Bandwidth:

Management S

Allow:

Edit Physical In

Basics

Name:

Status:

Description:

Type: Yes

Zone:

Basic At: No

Reverse:

IP Assignment: ☒ Static

Static IP:

Default Gateway:

Link Bandwidth:

Management S

Allow:

Edit Physical Interface

Basics

Name: eth6

Status: ☒ Enabled ☐ Disabled

Description: Optional

Type: Virtual wire

Zone: Virtual_untrust_A

Basic At: -

Reverse: -

Link Mode:

IPv4 MTU: 1500

IPv6 MTU: 1500

Jumbo Frame ☒ Enable

MAC Address: fe:fc:fe:8f:88:48

Link Bandwidth: Outbound 1000 Mbps Inbound 1000 Mbps

Management Service

Allow: ☒ WEBUI ☒ PING ☐ SNMP ☒ SSH

								Full-duplex 1000Mbps	1500/1500	✓	Edit
Auto-negotiation											
								Full-duplex 1000Mbps	1500/1500	✓	Edit
Auto-negotiation											

OK

Cancel

Case 4: Active/Active with Virtual Wire Mode



In expected passive controller NSF, business and high availability interfaces are configured as below.

The image displays four screenshots of the 'Edit Physical Interface' configuration window, showing the configuration for interfaces eth5 and eth6. The configuration is divided into two main sections: Basics and Advanced.

Basics Section:

- Name:** eth5 (for the first two screenshots) and eth6 (for the last two).
- Status:** Enabled (radio button selected).
- Description:** Optional.
- Type:** Layer 3.
- Zone:** Control-Link (for eth5) and Data-Link (for eth6).
- Basic Attributes:** WAN attribute (checkbox unchecked).
- Reverse Routing:** Enabled (checkbox unchecked).

Advanced Section:

- IP Assignment:** Static (radio button selected).
- Static IP:** (field empty for eth5, 172.16.98 for eth6).
- Default Gateway:** (field empty).
- Link Mode:** (dropdown menu).
- IPv4 MTU:** 1500.
- IPv6 MTU:** 1500.
- Jumbo Frame:** Enabled (checkbox checked, highlighted with a red box).
- MAC Address:** fe:fc:fe:7b:73:8c (for eth5) and fe:fc:fe:b5:be:48 (for eth6).
- Restore Defaults:** (button).

Management Service Section:

- Allow:** WEBUI (checkbox checked), PING (checkbox checked), and other services (checkboxes unchecked).

Link Bandwidth Section:

- Outbound:** 1000 Mbps.
- Inbound:** 1000 Mbps.

Buttons: OK and Cancel.

Case 4: Active/Active with Virtual Wire Mode



In expected active controller NSF, business and high availability interfaces are configured as below.

← | HA Policy Settings

HA Policy:

☒ Enable

Mode:

☐ Active/Standby

Device Name:

HQ-NGAF

Control Link ⓘ:

eth5

Data Link ⓘ:

eth6

Layer 2 Mode ⓘ:

☒ Enable

HA Traffic:

☐ Enable ⓘ

Link Aggregation ⓘ:

Settings

Link Aggregation

☒ Enable ⓘ

LAN Interfaces ⓘ

+ Add | Delete

<input type="checkbox"/> Local Interface	Peer Interface	Operation
<input type="checkbox"/> eth3	eth3	Delete

WAN Interfaces ⓘ

+ Add | Delete

<input type="checkbox"/> Local Interface	Peer Interface	Operation
<input type="checkbox"/> eth2	eth2	Delete

Save

Cancel

172.16.99.6

+

172.168.98.6

+

Case 4: Active/Active with Virtual Wire Mode



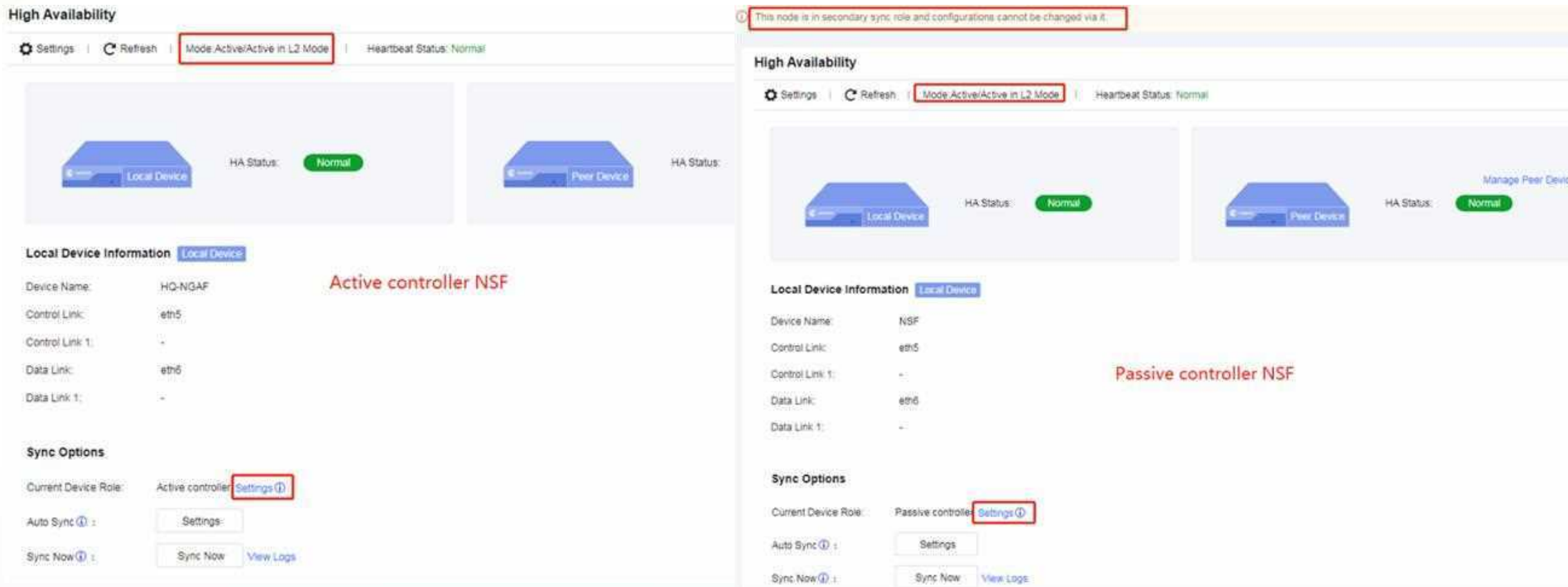
In expected passive controller NSF, business and high availability interfaces are configured as below.

← HA Policy Settings

HA Policy:	<input checked="" type="checkbox"/> Enable
Mode:	<input type="radio"/> Active/Standby <input checked="" type="radio"/> Active/Active
Device Name:	NSF
Control Link ⓘ:	<div>eth5 ▼</div> <div>Local 172.16.99.6 ▼ Peer 172.16.99.5 +</div>
Data Link ⓘ:	<div>eth6 ▼</div> <div>Local 172.16.98.6 ▼ Peer 172.16.98.5 +</div>
Layer 2 Mode ⓘ:	<input checked="" type="checkbox"/> Enable
HA Traffic:	<input type="checkbox"/> Enable ⓘ
Link Aggregation ⓘ:	<div>Settings</div>

Case 4: Active/Active with Virtual Wire Mode

The successful high availability status is shown as below.



The image displays two screenshots of the Sangfor NSAF (Network Security Agent Framework) interface, illustrating the High Availability (HA) status for a Local Device and a Peer Device in Active/Active mode.

Left Screenshot (Local Device):

- High Availability:** Mode: Active/Active in L2 Mode | Heartbeat Status: Normal
- Local Device Information:** Device Name: HQ-NGAF, Control Link: eth5, Data Link: eth6. **Active controller NSF**
- Sync Options:** Current Device Role: Active controller. Auto Sync: Settings. Sync Now: Sync Now | View Logs.

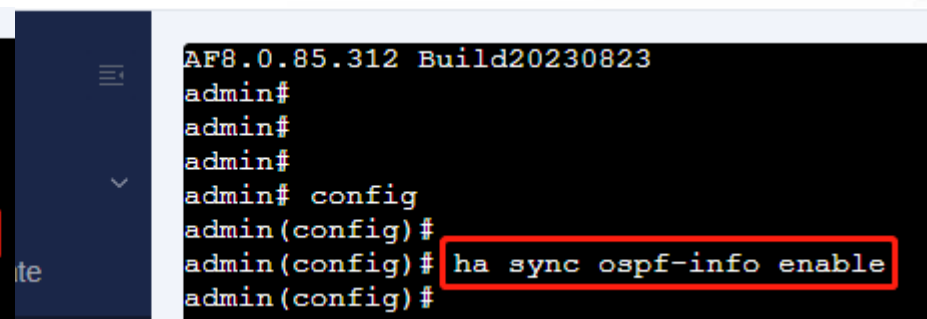
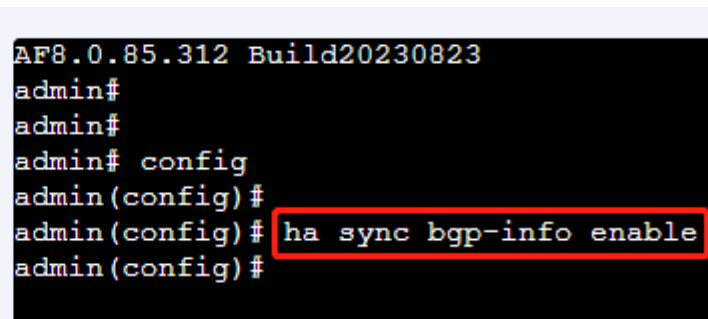
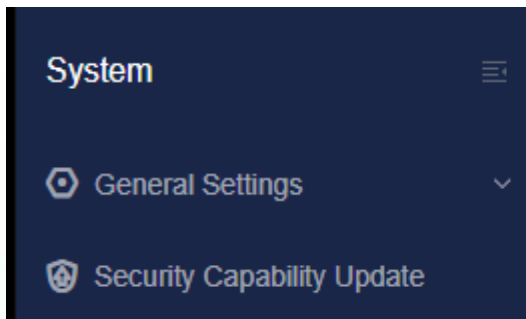
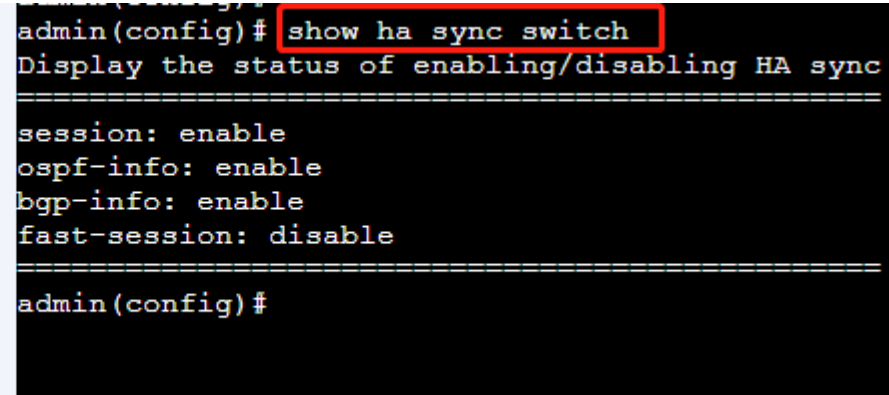
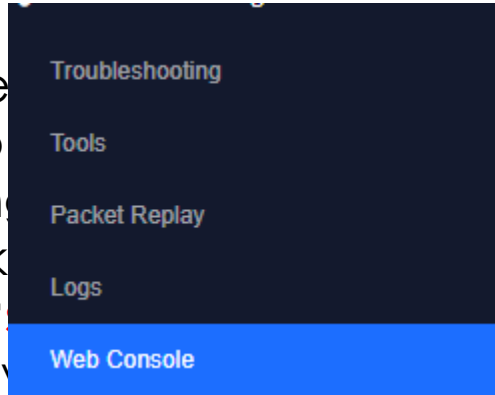
Right Screenshot (Peer Device):

- High Availability:** Mode: Active/Active in L2 Mode | Heartbeat Status: Normal. **This node is in secondary sync role and configurations cannot be changed via it.**
- Local Device Information:** Device Name: NSF, Control Link: eth5, Data Link: eth6. **Passive controller NSF**
- Sync Options:** Current Device Role: Passive controller. Auto Sync: Settings. Sync Now: Sync Now | View Logs.

Note:

In active/active with virtual wire mode, you are able to manually shift device role by clicking above "Setting".

- For inconsistent traffic scenario as well as active/active high availability mode, if interfaces of uplink and downlink devices NSF connected are route interfaces, it is necessary to turn on “**HA traffic**” feature, while “**Link Aggregation**” feature.
- You are suggested to turn on “**Link**” feature for improving link.
- If uplink and downlink devices use different link aggregation algorithm, the traffic may be inconsistent.
- As for dynamic routing circumstance, such as: OSPF and BGP, you need to manually sync routing from active to standby NSF, by executing below command in web-console.



THANK YOU

Technical Support Service

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