



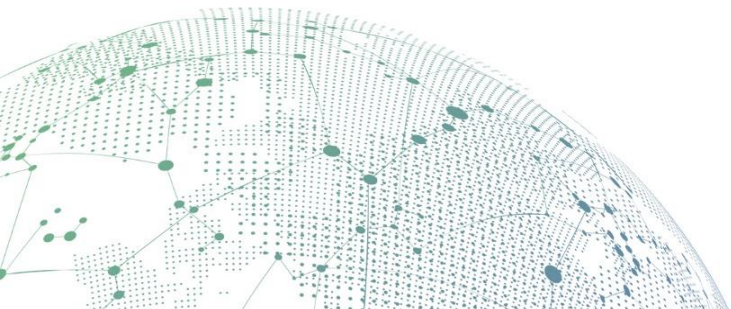
**SANGFOR**



# NGAF

## High Availability Deployed in Route Mode Guide

**Version 8.0.6**



## Table of Contents

1 Functions introductions.....	1
2 Application scenarios.....	1
3 Description of necessary conditions.....	2
4 Configuration ideas .....	2
5 Configuration and screenshot .....	3
5.1 Scenario 1: Two devices, one active and one standby. ....	3
5.2 Scenario 2: Two devices work at the same time. ....	12
6 Precautions .....	18

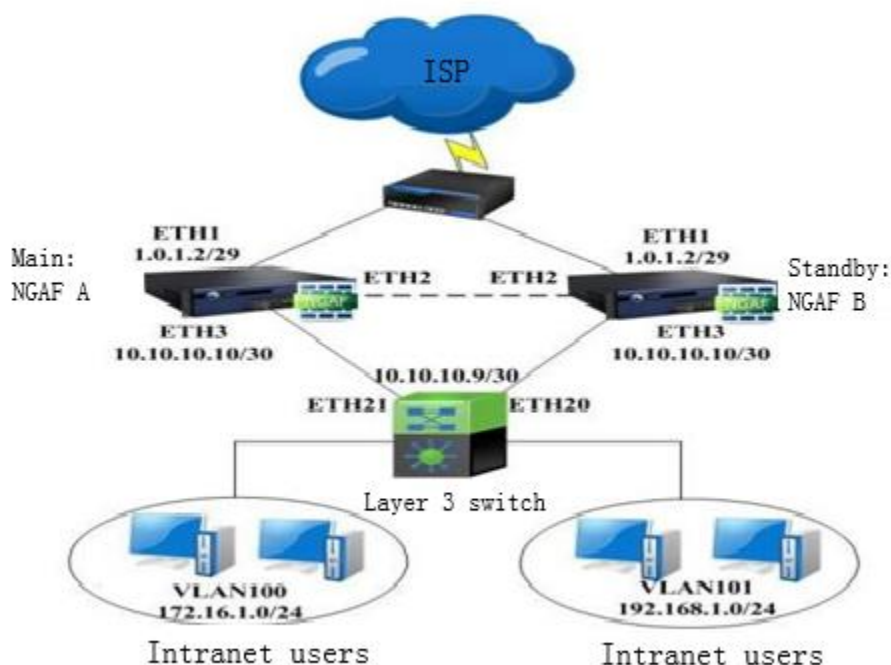
# 1 Functions introductions

The Internet is becoming more and more widely used in daily life, means that the stability and security of the network are becoming more and more important. Failure of a gateway device in the network may cause unpredictable losses. In order to prevent this type of failure, the high availability of the equipment is particularly important. Active – active mode is a way to achieve high availability. Two models and versions of the same NGAF can be used in parallel, connected by a heartbeat interface and keep the information and status synchronized. When a NGAF is down or the link connected to the NGAF is abnormal, it is able to assume all of its functions in a timely manner by another firewall, thus effectively ensuring customer network availability.

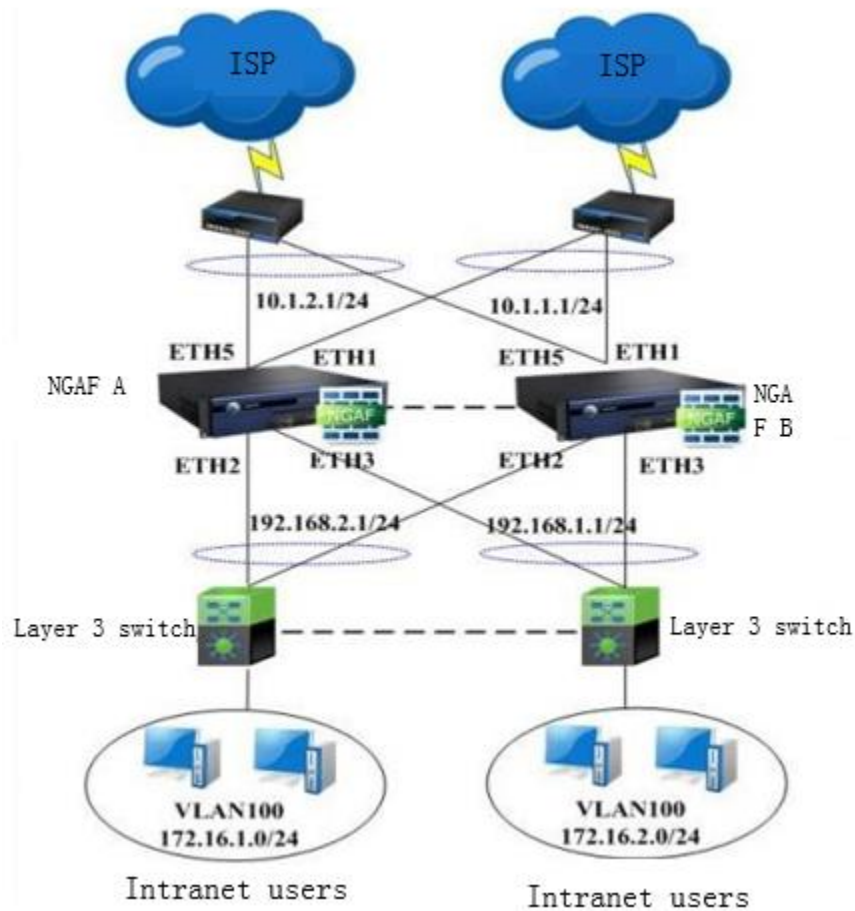
## 2 Application scenarios

High availability is mainly used in scenarios where the NGAF works in parallel or two devices work in parallel.

**Scenario 1:** Two devices, one active and one standby. As shown below:



**Scenario 2:** Two devices work at the same time. As shown below:



### 3 Description of necessary conditions

Two NGAF devices and meet the following requirements:

1. The MD5 value of the appversion file is the same.
2. The number of network ports on the device is the same (no requirement for the hardware platform).
3. Advanced Functionality license must valid.

### 4 Configuration ideas

1. Configure the network configuration of the active NGAF.
2. Configure the high availability of the active NGAF.
3. Configure the communication port of the standby NGAF.
4. Configure the high availability of the standby NGAF.

## 5 Configuration and screenshot

### 5.1 Scenario 1: Two devices, one active and one standby.

1. Configure NGAF A. Go to **Network > Interfaces > Physical interface**, configure IP address and other information.

**Eth1**, port defined as WAN network area as figure below:

**Edit Physical Interface**

☒ Enable

Name: eth1

Description:

Type: Route (layer 3) ▼

Added To Zone: Select zone ▼

Basic Attributes:

- ☐ Pingable
- ☒ WAN attribute
- ☐ IPsec VPN outgoing line: Line 1 ▼ ⓘ

IPv4 IPv6

☒ Static ☐ DHCP ☐ PPPoE

Static IP: 1.0.1.2/29 ⓘ

Next-Hop IP: 1.0.1.1 ⓘ

**Line Bandwidth**

Outbound: 1024 Mbps ▼

Inbound: 1024 Mbps ▼

**Link State Detection**

Specify link state detection method(s). Settings

**Advanced**

Configure link mode, MTU and MAC address. Settings

The interface is being used by VPN settings. VPN s... OK Cancel

**Eth3**, port defined as LAN network area as figure below:

**Edit Physical Interface**

☒ Enable

Name: eth3

Description:

Type: Route (layer 3) ▼

Added To Zone: LAN ▼

Basic Attributes:

- ☒ Pingable
- ☐ WAN attribute
- ☐ IPsec VPN outgoing line: Line 1 ▼ ⓘ

IPv4 IPv6

☒ Static ☐ DHCP ☐ PPPoE

Static IP: 10.10.10.10/24 ⓘ

Next-Hop IP: ⓘ

**Line Bandwidth**

Outbound: 1024 Mbps ▼

Inbound: 1024 Mbps ▼

**Link State Detection**

Specify link state detection method(s). Settings

**Advanced**

Configure link mode, MTU and MAC address. Settings

OK Cancel

**Eth2**, port defined as HA port as figure below:

Edit Physical Interface

✕

☑ Enable

Name:

eth2

Description:

Type:

Route (layer 3)

▼

Added To Zone:

Select zone

▼

Basic Attributes:

☑ Pingable

☐ WAN attribute

☐ IPSec VPN outgoing line:

Line 1

▼

i

IPv4

IPv6

● Static

● DHCP

● PPPoE

Static IP:

10.10.9.9/29-HA

i

Next-Hop IP:

i

Line Bandwidth

Outbound:

1024

Mbps ▼

Inbound:

1024

Mbps ▼

Link State Detection

Specify link state detection method(s).

Settings

Advanced

Configure link mode, MTU and MAC address.

Settings

OK

Cancel

2. NGAF A: Go to **Policies > NAT > Add**, configure SNAT as figure below:

**Edit SNAT Rule**

☒ Enable

For traffic from LAN All to WAN All, translate source to Egress interface

**Basics**

Name: Proxy

Description:

**Original Data Packet**

Src Zone: LAN

Network Objects: All

Dst Zone/Interface: Zone WAN

Network Objects: All

Protocol: All

**Translated Data Packet**

Translate Src To: Egress interface

OK Cancel

3. NGAF A: Go to **System > High Availability > Basic Settings**, select local eth2 as communication port. Fill in the peer address 10.10.9.10 as figure below:



**Basic Settings** | Redundancy | Sync Options

**Primary Link** ⓘ

Local Device IP: 10.10.9.9/24-HA(eth3) ⓘ

Peer Device IP: 10.10.9.10 Test ⓘ

☐ **Secondary Link** ⓘ

Local Device IP: None ⓘ

Peer Device IP: Required Test ⓘ

OK

- NGAF A. Go to **System > High Availability > Redundancy > Add**, configure the VRID as 100 and priority as 100 and click **No** on preemption. Member interface as eth1 and eth3 as figure below:

**Add VRRP Group** ✕

VRID: 100 (1-255)

Priority: 100 (1-255) ⓘ

Preemption: ☐ Yes ☒ No

Heartbeat Interval: 1 ⓘ

Member Interfaces: ⓘ

+ Add - Delete

<input type="checkbox"/>	No.	Interface Group	Edit
<input type="checkbox"/>	1	eth1,eth3	

Tracked Interfaces: ⓘ

+ Add - Delete

<input type="checkbox"/>	No.	Interface Group	Edit
No data available			

OK Cancel



**Note:** In route mode, if link state detection is set, the active/standby switchover conditions are three: do not receive heartbeat packet, physical interface in DOWN status, link state detection detected link failure. The active/standby switchover is performed when any of the above condition is met.

5. NGAF A. Go to **System > High Availability > Sync Options**, enable synchronization and choose 3 object as figure below:

Basic Settings | Redundancy | **Sync Options**

☒ Enable synchronization ⓘ

Auto Sync ⓘ

Objects:

Available:		Selected:
	Add ▶	User authentication
	◀ Delete	Configuration synchronization
		Session information

Role of This NGAF Unit: Active controller [Settings](#) ⓘ

Manual Sync ⓘ

[Sync Now](#)

[View Logs](#)

OK

6. Configure NGAF B. Go to **Network > Interfaces > Physical interface**, configure eth2 interface IP and other information as figure below:

Edit Physical Interface

×

☒ Enable

Name:

eth2

Description:

Type:

Route (layer 3)

▼

Added To Zone:

Select zone

▼

Basic Attributes:

☒ Pingable

☐ WAN attribute

☐ IPSec VPN outgoing line:

Line 1

▼

i

IPv4

IPv6

☒ Static
☐ DHCP
☐ PPPoE

Static IP:

10.10.9.10/29-HA

i

Next-Hop IP:

i

Line Bandwidth

Outbound:

1024

Mbps ▼

Inbound:

1024

Mbps ▼

Link State Detection

Specify link state detection method(s).

Settings

Advanced

Configure link mode, MTU and MAC address.

Settings

OK

Cancel

7. NGAF B. Go to **System > High Availability > Basic Settings**, configure local device IP of eth2 and peer device IP which is 10.10.9.9 as figure below:

**Basic Settings** | Redundancy | Sync Options

**Primary Link** ⓘ

Local Device IP: 10.10.9.10/24-HA(eth3) ⓘ

Peer Device IP: 10.10.9.9 Test ⓘ

☐ **Secondary Link** ⓘ

Local Device IP: None ⓘ

Peer Device IP: Required Test ⓘ

OK

8. NGAF B. Go to **System > High Availability > Redundancy**, configure the VRID to 100 which same with peer device, then priority set to 90. Click **NO** on preemption and member interface same with peer device as figure below:

**Add VRRP Group** ✕

VRID: 100 (1-255)

Priority: 90 (1-255) ⓘ

Preemption: ☐ Yes ☒ No

Heartbeat Interval: 1 ⓘ

Member Interfaces: ⓘ

+ Add - Delete			
<input type="checkbox"/>	No.	Interface Group	Edit
<input type="checkbox"/>	1	eth1,eth3	

Tracked Interfaces: ⓘ

+ Add - Delete			
<input type="checkbox"/>	No.	Interface Group	Edit
No data available			

OK Cancel



**Note:** In route mode, if link state detection is set, the active/standby switchover conditions are three: do not receive heartbeat packet, physical interface in DOWN status, link state detection detected link failure. The active/standby switchover is performed when any of the above condition is met.

9. NGAF B. Go to **System > High Availability > Sync Options**, enable the synchronization and select 3 objects as figure below:

Basic Settings | Redundancy | **Sync Options**

☒ Enable synchronization ⓘ

Auto Sync ⓘ

Objects:

Available: [Empty List]

Selected: [User authentication, Session information, Configuration synchroni:]

Add ▶

◀ Delete

Role of This NGAF Unit: Active controller [Settings](#) ⓘ

Manual Sync ⓘ

[Sync Now](#)

[View Logs](#)

OK

10. Power off NGAF A and NGAF B after configuration has been done, then connect all the cables. Power on the NGAF A first, after NGAF already power on then only power on NGAF B. Once NGAF B is power on, NGAF A will synchronize configuration to NGAF B.



**Note:** The boot sequence cannot be reversed.

## 5.2 Scenario 2: Two devices work at the same time.

1. NGAF A. First configure interface IP and other information, SNAT, packet return routing and policy-based route. Mainly here is eth3.

The screenshot shows the 'Edit Physical Interface' configuration window for interface 'eth4'. The window has a title bar with a close button. Below the title bar, there is a checkbox labeled 'Enable' which is checked. The main configuration area is divided into several sections:

- Name:** eth4
- Description:** (empty text field)
- Type:** Route (layer 3) (dropdown menu)
- Added To Zone:** Select zone (dropdown menu)
- Basic Attributes:**
  - ☒ Pingable
  - ☐ WAN attribute
  - ☐ IPSec VPN outgoing line: Line 1 (dropdown menu)

Below the Basic Attributes section, there are two tabs: 'IPv4' and 'IPv6'. The 'IPv4' tab is selected, and it contains the following configuration options:

- Static IP:** 3.3.3.1/24-HA (text field)
- Next-Hop IP:** (empty text field)

Below the IPv4 configuration, there is a section for 'Line Bandwidth' with two rows:

- Outbound:** 1024 Mbps (text field and dropdown menu)
- Inbound:** 1024 Mbps (text field and dropdown menu)

Below the Line Bandwidth section, there is a section for 'Link State Detection' with a text field labeled 'Specify link state detection method(s)' and a 'Settings' button.

Below the Link State Detection section, there is a section for 'Advanced' with a text field labeled 'Configure link mode, MTU and MAC address.' and a 'Settings' button.

At the bottom of the window, there are two buttons: 'OK' and 'Cancel'.

2. NGAF A. Go to **System > High Availability > Basic Settings**, configure local eth4 as local device IP and fill in the peer device IP correctly. This setting is mainly for two NGAF to synchronize configuration and negotiate VRRP usage, configure as figure below:

**Basic Settings** | Redundancy | Sync Options

**Primary Link** ⓘ

Local Device IP: 3.3.3.1/24-HA(eth3) ⓘ

Peer Device IP: 3.3.3.2 Test ⓘ

☐ **Secondary Link** ⓘ

Local Device IP: None ⓘ

Peer Device IP: Required Test ⓘ

OK

3. NGAF A. Go to **System > High Availability > Redundancy**, configure eth2 and eth 5 as member interface, VRID set to 50 and priority set to 50 and click Yes on preemption. Configure another redundancy, choose eth 1 and eth3 for member interface, VRID and priority set to 20 and click No on preemption as figure below:

Basic Settings | **Redundancy** | Sync Options

☒ Enable HA ⓘ | Refresh | Manage Peer Device ⓘ

+ Add - Delete Advanced

	VRID	Priority	Preemption	Heartbeat Int...	Member Interface	Tracked Interfaces	Status	Active/Standby Switch ⓘ	Delete
<input type="checkbox"/>	50	50	Yes	1s	eth2,eth5		Active	-	✗
<input checked="" type="checkbox"/>	20	20	No	1s	eth1,eth3		Standby	Switch to Active	✗



**Note:** In route mode, if link state detection is set, the active/standby switchover conditions are three: do not receive heartbeat packet, physical interface in DOWN status, link state detection detected link failure. The active/standby switchover is performed when any of the above condition is met.

4. NGAF A. Go to **System > High Availability > Sync Options**, enable synchronization and select 3 objects as figure below:

The screenshot shows the 'Sync Options' configuration window for NGAF A. The window has three tabs: 'Basic Settings', 'Redundancy', and 'Sync Options'. The 'Sync Options' tab is active. At the top, there is a checkbox labeled 'Enable synchronization' which is checked and highlighted with a red box. Below this, there is an 'Auto Sync' section with an information icon. It contains an 'Objects:' label and two lists: 'Available:' and 'Selected:'. The 'Available:' list is empty. The 'Selected:' list contains three items: 'User authentication', 'Session information', and 'Configuration synchroni...', which are highlighted with a red box. Between the two lists are 'Add' and 'Delete' buttons. Below the lists, the 'Role of This NGAF Unit' is set to 'Active controller' with a 'Settings' link and an information icon. At the bottom left, there is a 'Manual Sync' section with a 'Sync Now' button and a 'View Logs' link. At the bottom right, there is an 'OK' button.



5. NGAF B. Go to **Network > Interfaces > Physical Interface**, configure IP and other information for eth4 as figure below:

**Edit Physical Interface**

☒ Enable

Name: eth4

Description:

Type: Route (layer 3)

Added To Zone: Select zone

Basic Attributes:

- ☒ Pingable
- ☐ WAN attribute
- ☐ IPsec VPN outgoing line: Line 1

IPv4 IPv6

☒ Static ☐ DHCP ☐ PPPoE

Static IP: 3.3.3.2/24-HA

Next-Hop IP:

**Line Bandwidth**

Outbound: 1024 Mbps

Inbound: 1024 Mbps

**Link State Detection**

Specify link state detection method(s). [Settings](#)

**Advanced**

Configure link mode, MTU and MAC address. [Settings](#)

OK Cancel

- NGAF B. Go to **System > High Availability > Basic Settings**, configure eth4 as local device IP and fill the peer device IP correctly. This setting is mainly for two NGAF to synchronize configuration and negotiate VRRP usage, configure as figure below:

- NGAF B. Go to **System > High Availability > Redundancy**, select eth5 and eth2 as member interface, VRID set to 50 and priority set to 40 and click No on preemption. Select eth1 and eth3 as member interface, VRID set to 20 and priority set to 30 and click Yes on preemption as figure below:

Basic SettingsRedundancySync Options

Enable HA ⓘ

Refresh

Manage Peer Device ⓘ

+ Add

X Delete

Advanced

<input type="checkbox"/>	VRID	Priority	Preemption	Heartbeat Inte...	Member Interface	Tracked Interfaces	Status	Active/Standby Switch ⓘ	Delete
<input type="checkbox"/>	50	40	No	1s	eth5,eth2		Active	Switch to Standby	X
<input type="checkbox"/>	20	30	Yes	1s	eth1,eth3		Active	-	X

- NGAF B. Go to **System > High Availability > Sync Options** enable synchronization and select 3 objects as figure below:

Basic Settings

Redundancy

**Sync Options**

☒ Enable synchronization ⓘ

Auto Sync ⓘ

Objects:

Available:

Selected:

Add ▶

◀ Delete

Role of This NGAF Unit:

Active controller [Settings](#) ⓘ

Manual Sync ⓘ

Sync Now

[View Logs](#)

OK

- Power off NGAF A and NGAF B, then connect all cables. Power on NGAF first, after the NGAF A is power on then only power on NGAF B. Once NGAF B is power on, NGAF A will synchronize configuration to NGAF B.



**Note:** The boot sequence cannot be reversed.

## 6 Precautions

1. Active device's member interface must be configured to be consistent, HA interface recommended to be configured as consistent. Support dual-machine switching.
2. If the VRID and priority level is the same, even we enable preemption but it also will not preempt.
3. If the signature database license of device A has not expired, the signature database license of the device B rule base expires. After device A upgrades the rule base, the synchronization of the rule base of device A to the peer end fails, but does not affect the synchronization of other configurations.
4. The configuration synchronization will not synchronize the IP address information with the HA interface and the [High Availability] configuration.
5. In order to prevent the configuration of the standby device from being synchronized to the active device, the configuration of the active device is lost. It is recommended that only make configuration changes on the active device, at the same time device A is enabled the user authentication, session information and configuration synchronization are synchronized. Device B only enabled user authentication and session information.
6. Configuration synchronization supports the configuration in the IPv6 network environment; session information synchronization does not support the synchronization of IPv6 sessions. After the active/standby switchover, the IPv6 service needs to be reconnected.
7. The core switch used the SVI uplink interface to do VRRP and use the track ping detection as a switching condition.
8. Preemption and link state detection cannot be enabled at the same time.
9. Do not use the bypass interface to do dual-machine in order to avoid broadcast storm.
10. There are two types of configuration synchronization: batch synchronization and incremental synchronization. After the device is powered on, a configuration synchronization request is sent to the peer. It is requested to synchronize the configuration of the peer device to the local device, and batch synchronization will be performed at this time. After the batch synchronization is complete, the device will check the configuration in every 10 seconds to check whether there is any configuration change. If the change is made, the configuration modified by the local device is synchronized to the peer device, and incremental synchronization is performed at this time.



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