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Introduction

This document provides IPv6 over IPv4 GRE tunnel configuration examples.

Prerequisites

The configuration examples in this document were created and verified in a lab environment, and all the devices were started with the factory default configuration. When you are working on a live network, make sure you understand the potential impact of every command on your network.

This document assumes that you have basic knowledge of GRE.

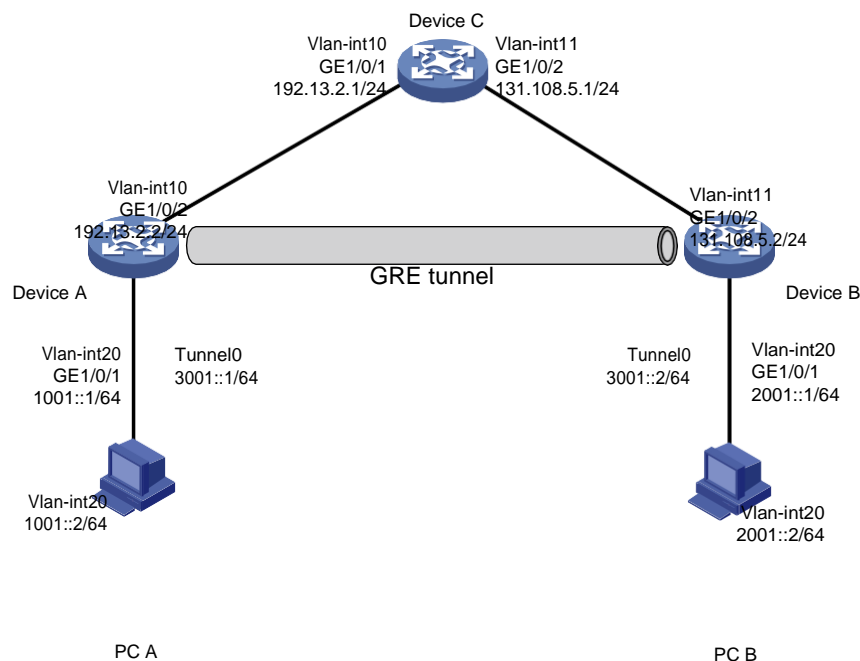
Example: Configuring an IPv6 over IPv4 GRE tunnel

Network configuration

As shown in [Figure 1](#), Device A, Device B, and Device C are all on an IPv4 network. Dual stack devices Device A and Device B each connect to an IPv6 host.

Configure a GRE/IPv4 tunnel between Device A and Device B, so PC A and PC B can communicate with each other over the IPv4 network.

Figure 1 Network diagram



Analysis

To meet the network requirements, perform the following tasks:

- To enable the IPv6 hosts to communicate over the IPv4 network, specify the GRE tunnel mode

as GRE/IPv4 and configure IPv6 addresses for the tunnel interfaces.

- To transmit packets between PC A and PC B through the GRE tunnel, configure a route reaching the destination network through the tunnel interface on Device A and Device B. You can configure the routes by using either of the following methods:
 - Configure static routes, using the peer tunnel interface as the next hop or using the local tunnel interface as the outgoing interface.
 - Enable a dynamic routing protocol on both the tunnel interfaces and the Layer 3 interfaces connected to PC A and PC B.
- For both ends of the GRE tunnel to reach each other, configure a static route reaching the remote end on Device A and Device B.

Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch	Not supported
SC 5525 switch series	Release 63xx, Release 65xx, Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 63xx, Release 65xx, Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Restrictions and guidelines

You must configure the tunnel source address and destination address at both ends of the tunnel. The tunnel source or destination address at one end must be the tunnel destination or source address at the other end.

Procedures

Configuring Device A

Configure VLAN-interface 20.

```
<DeviceA> system-view
[DeviceA] vlan 20
[DeviceA-vlan20] port GigabitEthernet 1/0/1
[DeviceA-vlan20] quit
[DeviceA] interface vlan-interface 20
[DeviceA-vlan-interface20] ipv6 address 1001::1 64
[DeviceA-vlan-interface20] quit
```

Configure other interfaces in the same way VLAN-interface 20 is configured. (Details not shown.)

Create service loopback group 1 and specify tunnel services for the group, and then add GigabitEthernet 1/0/3 to the group.

```
[DeviceA] service-loopback group 1 type tunnel
[DeviceA] interface gigabitethernet 1/0/3
[DeviceA-GigabitEthernet1/0/3] port service-loopback group 1
[DeviceA-GigabitEthernet1/0/3] quit
```

Create a tunnel interface named **Tunnel 0**, and specify the tunnel mode as GRE/IPv4.

```
[DeviceA] interface tunnel 0 mode gre
```

Configure an IPv6 address for tunnel interface **Tunnel 0**.

```
[DeviceA-Tunnel0] ipv6 address 3001::1 64
```

Configure the source address of tunnel interface **Tunnel 0** as the IP address of VLAN-interface 10.

```
[DeviceA-Tunnel0] source 192.13.2.2
```

Configure the destination address of tunnel interface **Tunnel 0** as the IP address of VLAN-interface 11 on Device B.

```
[DeviceA-Tunnel0] destination 131.108.5.2
[DeviceA-Tunnel0] quit
```

Configure a static route reaching PC B through tunnel interface **Tunnel 0**.

```
[DeviceA] ipv6 route-static 2001:: 64 tunnel 0
# Configure a static route reaching the remote end of the GRE tunnel.
[DeviceA] ip route-static 131.108.5.2 255.255.255.0 192.13.2.1
```

Configuring Device B

```
# Configure VLAN-interface 20.
<DeviceB> system-view
[DeviceB] vlan 20
[DeviceB-vlan20] port GigabitEthernet 1/0/1
[DeviceB] interface vlan-interface 20
[DeviceB-Vlan-interface20] ipv6 address 2001::1 64
[DeviceB-Vlan-interface20] quit

# Configure other interfaces in the same way VLAN-interface 20 is configured. (Details not shown.)
# Create service loopback group 1 and specify tunnel services for the group, and then add
GigabitEthernet 1/0/3 to the group.
[DeviceB] service-loopback group 1 type tunnel
[DeviceB] interface gigabitethernet 1/0/3
[DeviceB-GigabitEthernet1/0/3] port service-loopback group 1
[DeviceB-GigabitEthernet1/0/3] quit

# Create a tunnel interface named Tunnel 0, and specify the tunnel mode as GRE/IPv4.
[DeviceB] interface tunnel 0 mode gre

# Configure an IPv6 address for tunnel interface Tunnel 0.
[DeviceB-Tunnel0] ipv6 address 3001::2 64

# Configure the source address of tunnel interface Tunnel 0 as the IP address of VLAN-interface 11.
[DeviceB-Tunnel0] source 131.108.5.2

# Configure the destination address of tunnel interface Tunnel 0 as the IP address of VLAN-interface
10 on Device A.
[DeviceB-Tunnel0] destination 192.13.2.2
[DeviceB-Tunnel0] quit

# Configure a static route reaching PC A through tunnel interface Tunnel 0.
[DeviceB] ipv6 route-static 1001:: 64 Tunnel 0

# Configure a static route reaching the remote end of the GRE tunnel.
[DeviceB] ip route-static 192.13.2.2 255.255.255.0 131.108.5.1
```

Configuring Device C

```
# Configure VLAN-interface 10.
<DeviceC> system-view
[DeviceC] vlan 10
[DeviceC-vlan10] port GigabitEthernet 1/0/1
[DeviceC-vlan10] quit
[DeviceC] interface Vlan-interface 10
[DeviceC-Vlan-interface10] ip address 192.13.2.1 24
[DeviceC-Vlan-interface10] quit
```

```
# Configure VLAN-interface 11.
[DeviceC] vlan 11
[DeviceC-vlan11] port GigabitEthernet 1/0/2
[DeviceC-vlan11] quit
[DeviceC] interface vlan-interface 11
[DeviceC-Vlan-interface11] ip address 131.108.5.1 24
[DeviceC-Vlan-interface11] quit
```

Verifying the configuration

Verify that PC A and PC B can ping each other successfully. This example uses PC A to ping PC B.

```
C:\>ping6 2001::2
```

```
Pinging 2001::2
from 1001::1 with 32 bytes of data:
```

```
Reply from 2001::2: bytes=32 time<1ms
Reply from 2001::2: bytes=32 time<1ms
Reply from 2001::2: bytes=32 time<1ms
Reply from 2001::2: bytes=32 time<1ms
```

```
Ping statistics for 2001::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Configuration files



IMPORTANT:

Support for the **port link-mode bridge** command depends on the device model.

- Device A:


```
#
service-loopback group 1 type tunnel
#
vlan 10
#
vlan 20
#
interface Vlan-interface10
ip address 192.13.2.2 255.255.255.0
#
interface Vlan-interface20
ipv6 address 1001::1/64
#
interface GigabitEthernet1/0/1
port link-mode bridge
port access vlan 20
```

```
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 10
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port service-loopback group 1
#
interface Tunnel0 mode gre
 ipv6 address 3001::1/64
 source 192.13.2.2
 destination 131.108.5.2
#
ip route-static 131.108.5.2 255.255.255.0 192.13.2.1
#
ipv6 route-static 2001:: 64 Tunnel 0
#
```

- **Device B:**

```
#
 service-loopback group 1 type tunnel
#
vlan 11
#
vlan 20
#
interface Vlan-interface11
 ip address 131.108.5.2 255.255.255.0
#
interface Vlan-interface20
 ipv6 address 2001::1/64
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port access vlan 20
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 11
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port service-loopback group 1
#
interface Tunnel0 mode gre
 ipv6 address 3001::2/64
 source 131.108.5.2
 destination 192.13.2.2
```



```

#
ip route-static 192.13.2.2 255.255.255.0 131.108.5.1
#
ipv6 route-static 1001:: 64 Tunnel 0
#
• Device C:
#
vlan 10 to 11
#
interface Vlan-interface10
 ip address 192.13.2.1 255.255.255.0
#
interface Vlan-interface11
 ip address 131.108.5.1 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port access vlan 10
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 11
#

```