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# Introduction

This document provides IP unnumbered configuration examples.

This feature enables an interface to borrow an IP address from another interface on the device when the borrowing interface does not have any IP addresses. The borrowing interface is called IP unnumbered interface.

## 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 IP unnumbered.

## Restrictions and guidelines

When you configure IP unnumbered, follow these restrictions and guidelines:

- Loopback interfaces cannot borrow IP addresses of other interfaces.
- An interface cannot borrow an IP address from an unnumbered interface.
- If an interface has multiple manually configured IP addresses, only the manually configured primary IP address can be borrowed.

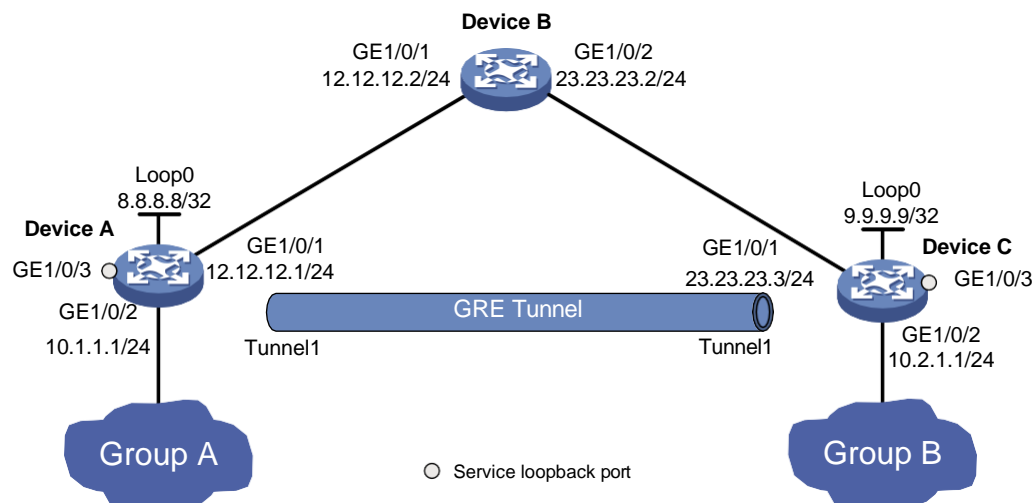
## Example: Configuring IP unnumbered

### Network configuration

As shown in [Figure 1](#), Group A and Group B are two private IPv4 networks. Device A and Device C will establish a GRE tunnel to interconnect Group 1 and Group 2.

To save IP address space, configure tunnel interface Tunnel 1 to borrow an IP address from the loopback interface loopback 0.

**Figure 1 Network diagram**



# 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 series	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	GRE tunneling not supported

# Procedures

## Configuring Device A

### 1. Assign IP addresses to the interfaces:

**# Assign IP addresses to GigabitEthernet 1/0/1 and loopback 0.**

```
<DeviceA> system-view
[DeviceA] interface gigabitethernet 1/0/1
[DeviceA-GigabitEthernet1/0/1] port link-mode route
[DeviceA-GigabitEthernet1/0/1] ip address 12.12.12.1 24
[DeviceA-GigabitEthernet1/0/1] quit
[DeviceA] interface loopback 0
[DeviceA-LoopBack0] ip address 8.8.8.8 32
[DeviceA-LoopBack0] quit
```

**# Assign IP addresses to other interfaces in the same way an IP address is assigned to GigabitEthernet 1/0/1. (Details not shown.)**

### 2. Configure OSPF:

**# Enable OSPF process 1.**

```
[DeviceA] ospf 1
```

**# Create Area 0 and specify GigabitEthernet 1/0/1 whose IP address is on network 12.12.12.0/24 to run OSPF in Area 0.**

```
[DeviceA-ospf-1] area 0
[DeviceA-ospf-1-area-0.0.0.0] network 12.12.12.0 0.0.0.255
[DeviceA-ospf-1-area-0.0.0.0] quit
[DeviceA-ospf-1] quit
```

### 3. Configure a GRE tunnel:

**# Create service loopback group 1 and specify the unicast tunnel service for the group.**

```
[DeviceA] service-loopback group 1 type tunnel
```

**# Assign GigabitEthernet 1/0/3 to the service loopback group.**

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

**# Create a tunnel interface Tunnel 1, and specify the tunnel mode as GRE/IPv4.**

```
[DeviceA] interface tunnel 1 mode gre
```

**# Specify 12.12.12.1 as the source address of interface Tunnel 1.**

```
[DeviceA-Tunnel1] source 12.12.12.1
```

**# Specify 23.23.23.3 as the destination address of interface Tunnel 1.**

```
[DeviceA-Tunnel1] destination 23.23.23.3
```

**# Configure interface Tunnel 1 to borrow an IP address from loopback 0.**

```
[DeviceA-Tunnel1] ip address unnumbered interface loopback 0
[DeviceA-Tunnel1] quit
```

**# Configure a static route from Device A through the tunnel interface to Group B.**

```
[DeviceA] ip route-static 10.2.1.0 255.255.255.0 tunnel 1
```

## Configuring Device B

1. Assign IP addresses to the interfaces:

# Assign an IP address to GigabitEthernet 1/0/1.

```
<DeviceB> system-view
[DeviceB] interface gigabitethernet 1/0/1
[DeviceB-GigabitEthernet1/0/1] port link-mode route
[DeviceB-GigabitEthernet1/0/1] ip address 12.12.12.2 24
[DeviceB-GigabitEthernet1/0/1] quit
```

# Assign an IP address to GigabitEthernet 1/0/2 in the same way an IP address is assigned to GigabitEthernet 1/0/1. (Details not shown.)

2. Configure OSPF:

# Enable OSPF process 1.

```
[DeviceB] ospf 1
```

# Create Area 0 and specify GigabitEthernet 1/0/1 whose IP address is on network 12.12.12.0/24 to run OSPF in Area 0.

```
[DeviceB-ospf-1] area 0
[DeviceB-ospf-1-area-0.0.0.0] network 12.12.12.0 0.0.0.255
```

# Create Area 0 and specify GigabitEthernet 1/0/2 whose IP address is on network 23.23.23.0/24 to run OSPF in Area 0.

```
[DeviceB-ospf-1-area-0.0.0.0] network 23.23.23.0 0.0.0.255
[DeviceB-ospf-1-area-0.0.0.0] quit
[DeviceB-ospf-1] quit
```

## Configuring Device C

1. Assign IP addresses to the interfaces:

# Assign IP addresses to GigabitEthernet 1/0/1 and loopback 0.

```
<DeviceC> system-view
[DeviceC] interface gigabitethernet 1/0/1
[DeviceC-GigabitEthernet1/0/1] port link-mode route
[DeviceC-GigabitEthernet1/0/1] ip address 23.23.23.3 24
[DeviceC-GigabitEthernet1/0/1] quit
[DeviceC] interface loopback 0
[DeviceC-LoopBack0] ip address 9.9.9.9 32
[DeviceC-LoopBack0] quit
```

# Assign IP addresses to other interfaces in the same way an IP address is assigned to GigabitEthernet 1/0/1. (Details not shown.)

2. Configure OSPF:

# Enable OSPF process 1.

```
[DeviceC] ospf 1
```

# Create Area 0 and specify GigabitEthernet 1/0/1 whose IP address is on network 23.23.23.0/24 to run OSPF in Area 0.

```
[DeviceC-ospf-1] area 0
[DeviceC-ospf-1-area-0.0.0.0] network 23.23.23.0 0.0.0.255
[DeviceC-ospf-1-area-0.0.0.0] quit
[DeviceC-ospf-1] quit
```

3. Configure a GRE tunnel:

**# Create service loopback group 1 and specify the unicast tunnel service for the group.**

```
[DeviceC] service-loopback group 1 type tunnel
```

**# Assign GigabitEthernet 1/0/3 to the service loopback group.**

```
[DeviceC] interface gigabitethernet 1/0/3
```

```
[DeviceC-GigabitEthernet1/0/3] port service-loopback group 1
```

```
[DeviceC-GigabitEthernet1/0/3] quit
```

**# Create a tunnel interface Tunnel 1, and specify the tunnel mode as GRE/IPv4.**

```
[DeviceC] interface tunnel 1 mode gre
```

**# Specify 23.23.23.3 as the source address of interface Tunnel 1.**

```
[DeviceC-Tunnel1] source 23.23.23.3
```

**# Specify 12.12.12.1 as the destination address of interface Tunnel 1.**

```
[DeviceC-Tunnel1] destination 12.12.12.1
```

**# Configure interface Tunnel 1 to borrow an IP address from loopback 0.**

```
[DeviceC-Tunnel1] ip address unnumbered interface loopback 0
```

```
[DeviceC-Tunnel1] quit
```

**# Configure a static route from Device C through the tunnel interface to Group A.**

```
[DeviceC] ip route-static 10.1.1.0 255.255.255.0 tunnel 1
```

## Verifying the configuration

This example uses Device A to verify the configuration.

**# Verify that the interface Tunnel 1 has borrowed the IP address 8.8.8.8/32 from loopback 0.**

```
[DeviceA] display interface tunnel 1
```

```
Tunnel1
```

```
Current state: UP
```

```
Line protocol state: UP
```

```
Description: Tunnel1 Interface
```

```
Bandwidth: 64kbps
```

```
Maximum transmission unit: 1476
```

```
Internet Address: 8.8.8.8/32 (Unnumbered)
```

```
Tunnel source 12.12.12.1, destination 23.23.23.3
```

```
Tunnel keepalive disabled
```

```
Tunnel TTL 255
```

```
Tunnel protocol/transport GRE/IP
```

```
GRE key disabled
```

```
Checksumming of GRE packets disabled
```

```
Last clearing of counters: Never
```

```
Last 300 seconds input rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
```

```
Last 300 seconds output rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
```

```
Input: 11 packets, 924 bytes, 0 drops
```

```
Output: 10 packets, 840 bytes, 0 drops
```

**# Verify that GigabitEthernet 1/0/2 on Device A can ping the IP address of GigabitEthernet 1/0/2 on Device C.**

**# Verify that VLAN-interface 10 on Device A can ping the IP address of VLAN-interface 10 on Device C.**

```
[DeviceA] ping -a 10.1.1.1 10.2.1.1
```

```
Ping 10.2.1.1 (10.2.1.1) from 10.1.1.1: 56 data bytes, press CTRL_C to break
```

```

56 bytes from 10.2.1.1: icmp_seq=0 ttl=255 time=32.641 ms
56 bytes from 10.2.1.1: icmp_seq=1 ttl=255 time=4.881 ms
56 bytes from 10.2.1.1: icmp_seq=2 ttl=255 time=4.816 ms
56 bytes from 10.2.1.1: icmp_seq=3 ttl=255 time=26.393 ms
56 bytes from 10.2.1.1: icmp_seq=4 ttl=255 time=43.003 ms

--- Ping statistics for 10.2.1.1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 4.816/22.347/43.003/15.241 ms

```

## Configuration files



### IMPORTANT:

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

- Device A:

```

#
service-loopback group 1 type tunnel
#
ospf 1
area 0.0.0.0
network 12.12.12.0 0.0.0.255
#
vlan 10
#
vlan 12
#
interface LoopBack0
ip address 8.8.8.8 255.255.255.255
#
interface Vlan-interface10
ip address 10.1.1.1 255.255.255.0
#
interface Vlan-interface12
ip address 12.12.12.1 255.255.255.0
#
interface GigabitEthernet1/0/1
port link-mode route
ip address 12.12.12.1 255.255.255.0
#
interface GigabitEthernet1/0/2
port link-mode route
ip address 10.1.1.1 255.255.255.0
#
interface GigabitEthernet1/0/3
port link-mode bridge
port service-loopback group 1
#

```

```

interface Tunnel1 mode gre
 ip address unnumbered interface LoopBack0
 source 12.12.12.1
 destination 23.23.23.3
#
 ip route-static 10.2.1.0 24 Tunnel1
#

```

- **Device B:**

```

#
ospf 1
 area 0.0.0.0
  network 12.12.12.0 0.0.0.255
  network 23.23.23.0 0.0.0.255
#
vlan 12
#
vlan 23
#
interface Vlan-interface12
 ip address 12.12.12.2 255.255.255.0
#
interface Vlan-interface23
 ip address 23.23.23.3 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode route
 ip address 12.12.12.2 255.255.255.0
#
interface GigabitEthernet1/0/2
 port link-mode route
 ip address 23.23.23.2 255.255.255.0
#

```

- **Device C:**

```

#
 service-loopback group 1 type tunnel
#
ospf 1
 area 0.0.0.0
  network 23.23.23.0 0.0.0.255
#
vlan 10
#
vlan 23
#
interface LoopBack0
 ip address 9.9.9.9 255.255.255.255
#
interface Vlan-interface10

```



```

ip address 10.2.1.1 255.255.255.0
#
interface Vlan-interface23
ip address 23.23.23.3 255.255.255.0
#
interface GigabitEthernet1/0/1
port link-mode route
ip address 23.23.23.3 255.255.255.0
#
interface GigabitEthernet1/0/2
port link-mode route
ip address 10.2.1.1 255.255.255.0
#
interface GigabitEthernet1/0/3
port link-mode bridge
port service-loopback group 1
#
interface Tunnel1 mode gre
ip address unnumbered interface LoopBack0
source 23.23.23.3
destination 12.12.12.1
#
ip route-static 10.1.1.0 24 Tunnel1
#

```