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Introduction

This document provides GRE with OSPF 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 and OSPF.

Example: Configuring GRE with OSPF

Network configuration

As shown in [Figure 1](#), Device A is the gateway of the headquarters. Device B and Device C are the gateways of Branch 1 and Branch 2, respectively. The gateways have obtained public IP addresses from an ISP and can communicate with one another. Configure GRE with OSPF to meet the following requirements:

- The headquarters and the branches communicate with one another through the GRE tunnels established between the headquarters and the branches.
- The gateways learn the routes reaching the destination networks through the tunnel interfaces.

Figure 1 Network diagram

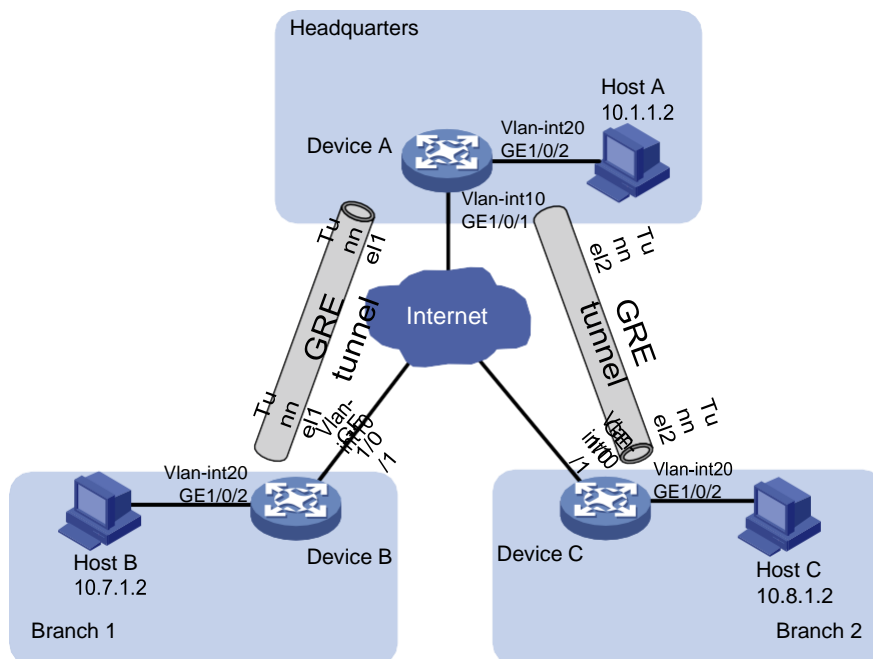


Table 1 Interface and IP address assignment

Device	Interface	IP address	Device	Interface	IP address
Device A	Vlan-int10	191.2.1.1/24	Device B	Vlan-int10	191.3.1.1/24
	Vlan-int20	10.1.1.1/24		Vlan-int20	10.7.1.1/24
	Tunnel1	10.5.1.1/24		Tunnel1	10.5.1.2/24
	Tunnel2	10.6.1.1/24			
Device C	Vlan-int10	191.4.1.1/24			
	Vlan-int20	10.8.1.1/24			
	Tunnel2	10.6.1.2/24			

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

Procedures

Before configuring GRE and OSPF, configure an IPv4 routing protocol on the gateways so that they can reach one another. (Details not shown.)

Configuring Device A

Configure VLAN-interface 10.

```
<DeviceA> system-view
[DeviceA] vlan 10
[DeviceA-vlan10] port GigabitEthernet 1/0/1
[DeviceA-vlan10] quit
[DeviceA] interface vlan-interface 10
[DeviceA-vlan-interface10] ip address 191.2.1.1 255.255.255.0
[DeviceA-vlan-interface10] quit
```

Configure other interfaces in the same way VLAN-interface 10 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 Tunnel 1, and specify the tunnel mode as GRE/IPv4.
[DeviceA] interface tunnel 1 mode gre

# Configure an IP address for the tunnel interface Tunnel 1.
[DeviceA-Tunnel1] ip address 10.5.1.1 24

# Configure the source interface of the tunnel interface Tunnel 1 as VLAN-interface 10.
[DeviceA-Tunnel1] source vlan-interface 10

# Configure the destination address of the tunnel interface Tunnel 1 as the IP address of VLAN-
interface 10 on Device B.
[DeviceA-Tunnel1] destination 191.3.1.1
[DeviceA-Tunnel1] quit

# Create a tunnel interface Tunnel 2, and specify the tunnel mode as GRE/IPv4.
[DeviceA] interface tunnel 2 mode gre
```

Configure an IP address for the tunnel interface **Tunnel 2**.

```
[DeviceA-Tunnel2] ip address 10.6.1.1 24
```

Configure the source interface of the tunnel interface **Tunnel 2** as VLAN-interface 10.

```
[DeviceA-Tunnel2] source vlan-interface 10
```

Configure the destination address of the tunnel interface **Tunnel 2** as the IP address of VLAN-interface 10 on Device C.

```
[DeviceA-Tunnel2] destination 191.4.1.1
```

```
[DeviceA-Tunnel2] quit
```

Configure the OSPF router ID as 10.6.1.1.

```
[DeviceA] router id 10.6.1.1
```

Enable OSPF process 1.

```
[DeviceA] ospf 1
```

Create OSPF area 0.

```
[DeviceA-ospf-1] area 0
```

Enable OSPF on interfaces whose primary IP addresses are on network 10.1.1.0/24, 10.5.1.0/24, or 10.6.1.0/24 in area 0.

```
[DeviceA-ospf-1-area-0.0.0.0] network 10.1.1.0 0.0.0.255
```

```
[DeviceA-ospf-1-area-0.0.0.0] network 10.5.1.0 0.0.0.255
```

```
[DeviceA-ospf-1-area-0.0.0.0] network 10.6.1.0 0.0.0.255
```

Configuring Device B

Configure VLAN-interface 10.

```
<DeviceB> system-view
```

```
[DeviceB] vlan 10
```

```
[DeviceB-vlan10] port GigabitEthernet 1/0/1
```

```
[DeviceB-vlan10] quit
```

```
[DeviceB] interface vlan-interface 10
```

```
[DeviceB-vlan-interface10] ip address 191.3.1.1 255.255.255.0
```

```
[DeviceB-vlan-interface10] quit
```

Configure other interfaces in the same way VLAN-interface 10 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 **Tunnel 1**, and specify the tunnel mode as GRE/IPv4.

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

Configure an IP address for the tunnel interface **Tunnel 1**.

```
[DeviceB-Tunnel1] ip address 10.5.1.2 24
```

Configure the source interface of the tunnel interface **Tunnel 1** as VLAN-interface 10.

```
[DeviceB-Tunnel1] source Vlan-interface 10
```

Configure the destination address of the tunnel interface **Tunnel 1** as the IP address of VLAN-interface 10 on Device A.

```

[DeviceB-Tunnel1] destination 191.2.1.1
[DeviceB-Tunnel1] quit

# Configure the OSPF router ID as 10.7.1.1.
[DeviceB] router id 10.7.1.1

# Enable OSPF process 1.
[DeviceB] ospf 1

# Create OSPF area 0.
[DeviceB-ospf-1] area 0

# Enable OSPF on interfaces whose primary IP addresses are on network 10.7.1.0/24 or 10.5.1.0/24
in area 0.
[DeviceB-ospf-1-area-0.0.0.0] network 10.7.1.0 0.0.0.255
[DeviceB-ospf-1-area-0.0.0.0] network 10.5.1.0 0.0.0.255

```

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 191.4.1.1 255.255.255.0
[DeviceC-Vlan-interface10] quit

# Configure other interfaces in the same way VLAN-interface 10 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.
[DeviceC] service-loopback group 1 type tunnel
[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 2, and specify the tunnel mode as GRE/IPv4.
[DeviceC] interface tunnel 2 mode gre

# Configure an IP address for the tunnel interface Tunnel 2.
[DeviceC-Tunnel2] ip address 10.6.1.2 24

# Configure the source interface of the tunnel interface Tunnel 2 as VLAN-interface 10.
[DeviceC-Tunnel2] source Vlan-interface 10

# Configure the destination address of the tunnel interface Tunnel 2 as the IP address of VLAN-
interface 10 on Device A.
[DeviceC-Tunnel2] destination 191.2.1.1
[DeviceC-Tunnel2] quit

# Configure the OSPF router ID as 10.8.1.1.
[DeviceC] router id 10.8.1.1

# Enable OSPF process 1.
[DeviceC] ospf 1

# Create OSPF area 0.

```

```
[DeviceC-ospf-1] area 0
```

Enable OSPF on interfaces whose primary IP addresses are on network 10.8.1.0/24 or 10.6.1.0/24 in area 0.

```
[DeviceC-ospf-1-area-0.0.0.0] network 10.8.1.0 0.0.0.255
```

```
[DeviceC-ospf-1-area-0.0.0.0] network 10.6.1.0 0.0.0.255
```

Verifying the configuration

Verify that Host A can ping Host B successfully.

```
C:\> ping 10.7.1.2
```

```
Pinging 10.7.1.2 with 32 bytes of data:
```

```
Reply from 10.7.1.2: bytes=32 time=19ms TTL=253
```

```
Reply from 10.7.1.2: bytes=32 time<1ms TTL=253
```

```
Reply from 10.7.1.2: bytes=32 time<1ms TTL=253
```

```
Reply from 10.7.1.2: bytes=32 time<1ms TTL=253
```

```
Ping statistics for 10.7.1.2:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 19ms, Average = 4ms
```

Verify that Host A can ping Host C successfully.

```
C:\> ping 10.8.1.2
```

```
Pinging 10.8.1.2 with 32 bytes of data:
```

```
Reply from 10.8.1.2: bytes=32 time=18ms TTL=253
```

```
Reply from 10.8.1.2: bytes=32 time<1ms TTL=253
```

```
Reply from 10.8.1.2: bytes=32 time<1ms TTL=253
```

```
Reply from 10.8.1.2: bytes=32 time<1ms TTL=253
```

```
Ping statistics for 10.8.1.2:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 19ms, Average = 4ms
```

Verify that Host B can ping Host C successfully.

```
C:\> ping 10.8.1.2
```

```
Pinging 10.8.1.2 with 32 bytes of data:
```

```
Reply from 10.8.1.2: bytes=32 time=20ms TTL=251
```

```
Reply from 10.8.1.2: bytes=32 time<1ms TTL=251
```

```
Reply from 10.8.1.2: bytes=32 time<1ms TTL=251
```

```
Reply from 10.8.1.2: bytes=32 time<1ms TTL=251
```

```
Ping statistics for 10.8.1.2:
```

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 19ms, Average = 4ms

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 191.2.1.1 255.255.255.0
#
interface Vlan-interface20
ip address 10.1.1.1 255.255.255.0
#
interface GigabitEthernet1/0/1
port link-mode bridge
port access vlan 10
#
interface GigabitEthernet1/0/2
port link-mode bridge
port access vlan 20
#
interface GigabitEthernet1/0/3
port link-mode bridge
port service-loopback group 1
#
interface Tunnel1 mode gre
source vlan-interface10
destination 191.3.1.1
ip address 10.5.1.1 255.255.255.0
#
interface Tunnel2 mode gre
source vlan-interface10
destination 191.4.1.1
ip address 10.6.1.1 255.255.255.0
#
router id 10.6.1.1
#
ospf 1
```



```

area 0.0.0.0
network 10.1.1.0 0.0.0.255
network 10.5.1.0 0.0.0.255
network 10.6.1.0 0.0.0.255

```

```
#
```

- **Device B**

```
#
```

```
service-loopback group 1 type tunnel
```

```
#
```

```
vlan 10
```

```
#
```

```
vlan 20
```

```
#
```

```
interface Vlan-interface10
```

```
ip address 191.3.1.1 255.255.255.0
```

```
#
```

```
interface Vlan-interface20
```

```
ip address 10.7.1.1 255.255.255.0
```

```
#
```

```
interface GigabitEthernet1/0/1
```

```
port link-mode bridge
```

```
port access vlan 10
```

```
#
```

```
interface GigabitEthernet1/0/2
```

```
port link-mode bridge
```

```
port access vlan 20
```

```
#
```

```
interface GigabitEthernet1/0/3
```

```
port link-mode bridge
```

```
port service-loopback group 1
```

```
#
```

```
interface Tunnel1 mode gre
```

```
source Vlan-interface10
```

```
destination 191.2.1.1
```

```
ip address 10.5.1.2 255.255.255.0
```

```
#
```

```
router id 10.7.1.1
```

```
#
```

```
ospf 1
```

```
area 0.0.0.0
```

```
network 10.7.1.0 0.0.0.255
```

```
network 10.5.1.0 0.0.0.255
```

```
#
```

- **Device C**

```
#
```

```
service-loopback group 1 type tunnel
```

```
#
```

```
vlan 10
```

```

#
vlan 20
#
interface Vlan-interface10
 ip address 191.4.1.1 255.255.255.0
#
interface Vlan-interface20
 ip address 10.8.1.1 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port access vlan 10
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 20
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port service-loopback group 1
#
interface Tunnel2 mode gre
 source Vlan-interface10
 destination 191.2.1.1
 ip address 10.6.1.2 255.255.255.0
#
router id 10.8.1.1
#
ospf 1
 area 0.0.0.0
  network 10.8.1.0 0.0.0.255
  network 10.6.1.0 0.0.0.255
#

```