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Introduction

This document provides IS-IS 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 IS-IS.

Example: Configuring IS-IS

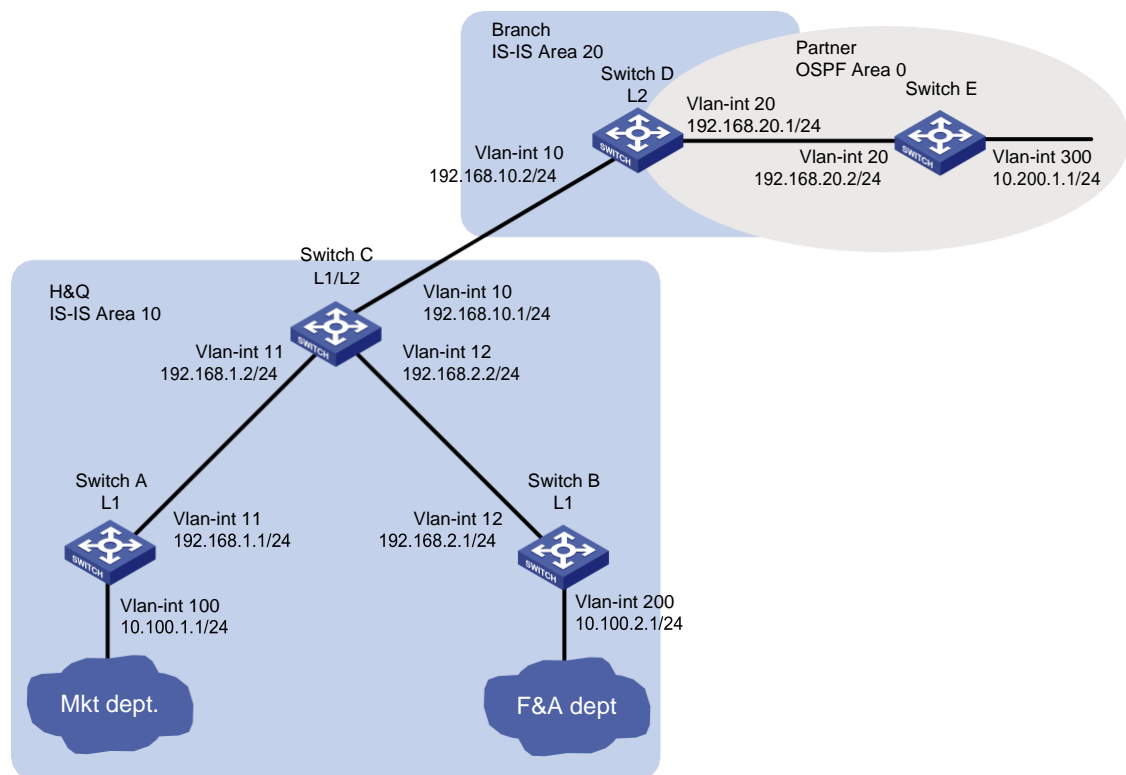
Network configuration

As shown in [Figure 1](#), the company's headquarters and the branch run IS-IS. The partner runs OSPF.

Configure the switches to meet the following requirements:

- The marketing department can reach the finance department, the branch, and the partner.
- The finance department and the branch cannot reach each other, and the branch does not have a route to the finance department.
- When the IS-IS process on Switch C restarts, the communication is not interrupted.

Figure 1 Network diagram



Analysis

To allow communication between the marketing department and the finance department, configure Switch A and Switch B in Area 10 as Level-1 routers.

To allow communication between the marketing department and the partner, configure route redistribution between IS-IS and OSPF on Switch D.

To ensure that the branch does not have a route to the finance department, configure Switch C to use a prefix list to advertise only network 10.100.1.0/24 to Level-2.

To ensure that the communication is not interrupted when the IS-IS process on Switch C restarts, enable IS-IS Graceful Restart (GR) on Switch C.

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 3170 switch series	Not supported
SC 3130 switch series	Not supported
SC 3570 switch series	Release 11xx

Restrictions and guidelines

To avoid blackhole routes, do not change the network topology during the IS-IS GR process.

Procedures

Configuring Switch A

Configure an IP address for VLAN-interface 11.

```
<SwitchA> system-view
[SwitchA] interface vlan-interface 11
[SwitchA-Vlan-interface11] ip address 192.168.1.1 24
[SwitchA-Vlan-interface11] quit
```

Configure IP addresses for other interfaces, as shown in [Figure 1](#). (Details not shown.)

Configure IS-IS.

```
[SwitchA] isis 1
[SwitchA-isis-1] is-level level-1
[SwitchA-isis-1] network-entity 10.1921.6800.1001.00
[SwitchA-isis-1] quit
[SwitchA] interface vlan-interface 11
[SwitchA-Vlan-interface11] isis enable 1
```

```
[SwitchA-Vlan-interface11] quit
[SwitchA] interface vlan-interface 100
[SwitchA-Vlan-interface100] isis enable 1
[SwitchA-Vlan-interface100] quit
```

Configuring Switch B

Configure an IP address for VLAN-interface 12.

```
<SwitchB> system-view
[SwitchB] interface vlan-interface 12
[SwitchB-Vlan-interface12] ip address 192.168.2.1 24
[SwitchB-Vlan-interface12] quit
```

Configure IP addresses for other interfaces, as shown in [Figure 1](#). (Details not shown.)

Configure IS-IS.

```
[SwitchB] isis 1
[SwitchB-isis-1] is-level level-1
[SwitchB-isis-1] network-entity 10.1921.6800.2001.00
[SwitchB-isis-1] quit
[SwitchB] interface vlan-interface 12
```

```
[SwitchB-Vlan-interface12] isis enable 1
[SwitchB-Vlan-interface12] quit
[SwitchB] interface vlan-interface 200
[SwitchB-Vlan-interface 200] isis enable 1
[SwitchB-Vlan-interface 200] quit
```

Configuring Switch C

Configure an IP address for VLAN-interface 11.

```
<SwitchC> system-view
[SwitchC] interface vlan-interface 11
[SwitchC-Vlan-interface11] ip address 192.168.1.2 24
[SwitchC-Vlan-interface11] quit
```

Configure IP addresses for other interfaces, as shown in [Figure 1](#). (Details not shown.)

Configure IS-IS.

```
[SwitchC] isis 1
[SwitchC-isis-1] network-entity 10.1921.6801.0001.00
[SwitchC-isis-1] quit
[SwitchC] interface vlan-interface 10
[SwitchC-Vlan-interface10] isis enable 1
[SwitchC-Vlan-interface10] quit
[SwitchC] interface vlan-interface 11
[SwitchC-Vlan-interface11] isis enable 1
[SwitchC-Vlan-interface11] quit
[SwitchC] interface vlan-interface 12
[SwitchC-Vlan-interface12] isis enable 1
[SwitchC-Vlan-interface12] quit
```

Configure route leaking from Level-1 to Level-2, and use prefix list 1 to advertise only network 10.100.1.0/24 to Level-2.

```
[SwitchC] ip prefix-list 1 permit 10.100.1.0 24
[SwitchC] isis 1
[SwitchC-isis-1] address-family ipv4
[SwitchC-isis-1-ipv4] import-route isis level-1 into level-2 filter-policy prefix-list 1
[SwitchC-isis-1-ipv4] quit
```

Enable IS-IS GR.

```
[SwitchC-isis-1] graceful-restart
[SwitchC-isis-1] quit
```

Configuring Switch D

Configure an IP address for VLAN-interface 10.

```
<SwitchD> system-view
[SwitchD] interface vlan-interface 10
[SwitchD-Vlan-interface10] ip address 192.168.10.2 24
[SwitchD-Vlan-interface10] quit
```

Configure IP addresses for other interfaces, as shown in [Figure 1](#). (Details not shown.)

Configure IS-IS.

```
[SwitchD] isis 1
[SwitchD-isis-1] is-level level-2
[SwitchD-isis-1] network-entity 10.1921.6802.0001.00
[SwitchD-isis-1] quit
[SwitchD] interface vlan-interface 10
[SwitchD-Vlan-interface10] isis enable 1
[SwitchD-Vlan-interface10] quit
[SwitchD] interface vlan-interface 20
[SwitchD-Vlan-interface20] isis enable 1
[SwitchD-Vlan-interface20] quit
```

Configure OSPF.

```
[SwitchD] ospf
[SwitchD-ospf-1] area 0
[SwitchD-ospf-1-area-0.0.0.0] network 192.168.20.0 0.0.0.255
[SwitchD-ospf-1-area-0.0.0.0] quit
[SwitchD-ospf-1] quit
```

Redistribute OSPF and direct routes into IS-IS

```
[SwitchD] isis 1
[SwitchD-isis-1] address-family ipv4
[SwitchD-isis-1-ipv4] import-route ospf
[SwitchD-isis-1-ipv4] import-route direct
[SwitchD-isis-1-ipv4] quit
[SwitchD-isis-1] quit
```

Redistribute IS-IS and direct routes into OSPF.

```
[SwitchD] ospf 1
[SwitchD-ospf-1] import-route isis 1
[SwitchD-ospf-1] import-route direct
```

Configuring Switch E

Configure an IP address for VLAN-interface 20.

```
<SwitchE> system-view
[SwitchE] interface vlan-interface20
[SwitchE-Vlan-interface12] ip address 192.168.20.2 24
[SwitchE-Vlan-interface12] quit
```

Configure IP addresses for other interfaces, as shown in [Figure 1](#). (Details not shown.)

Configure OSPF.

```
[SwitchE] ospf
[SwitchE-ospf-1] area 0
[SwitchE-ospf-1-area-0.0.0.0] network 192.168.20.0 0.0.0.255
[SwitchE-ospf-1-area-0.0.0.0] network 10.200.1.0 0.0.0.255
[SwitchE-ospf-1-area-0.0.0.0] quit
[SwitchE-ospf-1] quit
```

Verifying the configuration

Verify that the branch can reach the marketing department, but cannot reach the finance department.

```
[SwitchD] display isis route
```

```
Route information for IS-IS(1)
-----
Level-2 IPv4 Forwarding Table
-----
```

IPv4 Destination	IntCost	ExtCost	ExitInterface	NextHop	Flags
192.168.10.0/24	10	NULL	Vlan10	Direct	D/L/-
192.168.1.0/24	20	NULL	Vlan10	192.168.10.1	R/-/-
10.100.1.0/24	30	NULL	Vlan10	192.168.10.1	R/-/-
192.168.2.0/24	20	NULL	Vlan10	192.168.10.1	R/-/-

Flags: D-Direct, R-Added to Rib, L-Advertised in LSPs, U-Up/Down Bit Set

Verify that the marketing department can communicate with the partner.

- Display the IS-IS routing table on Switch C.

```
[SwitchC] display isis route
```

```
Route information for IS-IS(1)
-----
Level-1 IPv4 Forwarding Table
-----
```

IPv4 Destination	IntCost	ExtCost	ExitInterface	NextHop	Flags
192.168.10.0/24	10	NULL	Vlan10	Direct	D/L/-
192.168.1.0/24	10	NULL	Vlan11	Direct	D/L/-
10.100.1.0/24	20	NULL	Vlan11	192.168.1.1	R/L/-
10.100.2.0/24	20	NULL	Vlan12	192.168.2.1	R/-/-
192.168.2.0/24	10	NULL	Vlan12	Direct	D/L/-

Flags: D-Direct, R-Added to Rib, L-Advertised in LSPs, U-Up/Down Bit Set

```
Level-2 IPv4 Forwarding Table
-----
```

IPv4 Destination	IntCost	ExtCost	ExitInterface	NextHop	Flags
192.168.10.0/24	10	NULL	Vlan10	Direct	D/L/-
10.200.1.0/24	10	0	Vlan10	192.168.10.2	R/-/-
192.168.20.0/24	10	0	Vlan10	192.168.10.2	R/-/-
192.168.1.0/24	10	NULL	Vlan11	Direct	D/L/-
192.168.2.0/24	10	NULL	Vlan12	Direct	D/L/-

Flags: D-Direct, R-Added to Rib, L-Advertised in LSPs, U-Up/Down Bit Set

- Ping 10.200.1.1 from Switch A.

```
[SwitchA] ping 10.200.1.1
```

```
Ping 10.200.1.1 (10.200.1.1): 56 data bytes, press CTRL+C to break
```

```
56 bytes from 10.200.1.1: icmp_seq=0 ttl=254 time=1.862 ms
```

```
56 bytes from 10.200.1.1: icmp_seq=1 ttl=254 time=2.969 ms
```

```
56 bytes from 10.200.1.1: icmp_seq=2 ttl=254 time=1.402 ms
```

```

56 bytes from 10.200.1.1: icmp_seq=3 ttl=254 time=1.324 ms
56 bytes from 10.200.1.1: icmp_seq=4 ttl=254 time=1.510 ms
--- Ping statistics for 10.200.1.1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.324/1.813/2.969/0.606 ms

```

Verify that the communication is not interrupted when the IS-IS process restarts.

- **Ping Switch B from Switch A.**

```

[SwitchA] ping -c 10000 10.100.2.1
Ping 10.100.2.1 (10.100.2.1): 56 data bytes, press CTRL+C to break
56 bytes from 10.100.2.1: icmp_seq=0 ttl=254 time=1.185 ms
56 bytes from 10.100.2.1: icmp_seq=1 ttl=254 time=1.087 ms
...

```

- **Restart the IS-IS process on Switch C.**

```

[SwitchC] reset isis all graceful-restart
Reset IS-IS process? [Y/N] :y

```

Ping Switch B from Switch A.

```

[SwitchA] ping -c 10000 10.100.2.1
Ping 10.100.2.1 (10.100.2.1): 56 data bytes, press CTRL+C to break
56 bytes from 10.100.2.1: icmp_seq=0 ttl=254 time=1.185 ms
56 bytes from 10.100.2.1: icmp_seq=1 ttl=254 time=1.087 ms
56 bytes from 13.13.13.3: icmp_seq=2 ttl=254 time=1.672 ms
56 bytes from 13.13.13.3: icmp_seq=3 ttl=254 time=1.751 ms
56 bytes from 13.13.13.3: icmp_seq=4 ttl=254 time=1.816 ms
56 bytes from 13.13.13.3: icmp_seq=5 ttl=254 time=1.814 ms

```

Check the IS-IS GR state on Switch C.

```

[SwitchC] display isis graceful-restart status

Restart information for IS-IS(1)
-----
Restart status: COMPLETE
Restart phase: Finish
Restart t1: 3, count 10; Restart t2: 60; Restart t3: 300
SA Bit: supported

Level-1 restart information
-----
Total number of interfaces: 3
Number of waiting LSPs: 0

Level-2 restart information
-----
Total number of interfaces: 3
Number of waiting LSPs: 0

```

Configuration files

- **Switch A:**

```

#
isis 1
 is-level level-1

```



```

    network-entity 10.1921.6800.1001.00
#
vlan 11
#
vlan 100
#
interface Vlan-interface11
    ip address 192.168.1.1 255.255.255.0
    isis enable 1
#
interface Vlan-interface100
    ip address 10.100.1.1 255.255.255.0
    isis enable 1
#
• Switch B:
#
isis 1
    is-level level-1
    network-entity 10.1921.6800.2001.00
#
vlan 12
#
vlan 200
#
interface Vlan-interface12
    ip address 192.168.2.1 255.255.255.0
    isis enable 1
#
interface Vlan-interface200
    ip address 10.100.2.1 255.255.255.0
    isis enable 1
#
• Switch C:
#
isis 1
    graceful-restart
    network-entity 10.1921.6801.0001.00
#
    address-family ipv4 unicast
        import-route isis level-1 into level-2 filter-policy prefix-list 1
#
vlan 11 to 13
#
interface Vlan-interface11
    ip address 192.168.1.2 255.255.255.0
    isis enable 1
#
interface Vlan-interface12

```

```

ip address 192.168.2.2 255.255.255.0
isis enable 1
#
interface Vlan-interface13
ip address 192.168.10.1 255.255.255.0
isis enable 1
#
ip prefix-list 1 index 10 permit 10.100.1.0 24
#

```

- **Switch D:**

```

#
isis 1
is-level level-2
network-entity 20.1921.6802.0001.00
#
address-family ipv4 unicast
import-route direct
import-route ospf 1
#
ospf 1
import-route direct
import-route isis 1
area 0.0.0.0
network 192.168.20.0 0.0.0.255
#
vlan 10
#
vlan 20
#
interface Vlan-interface10
ip address 192.168.10.2 255.255.255.0
isis enable 1
#
interface Vlan-interface20
ip address 192.168.20.1 255.255.255.0
#

```

- **Switch E:**

```

#
ospf 1
area 0.0.0.0
network 10.200.1.0 0.0.0.255
network 192.168.20.0 0.0.0.255
#
vlan 20
#
vlan 300
#
interface Vlan-interface20

```

```
ip address 192.168.20.2 255.255.255.0
#
interface Vlan-interface300
ip address 10.200.1.1 255.255.255.0
#
```