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# Introduction

This document provides OSPF route filtering configuration examples.

## Prerequisites

This document is not restricted to specific software or hardware versions.

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 OSPF route filtering.

## Example: Configuring OSPF route filtering

### Network configuration

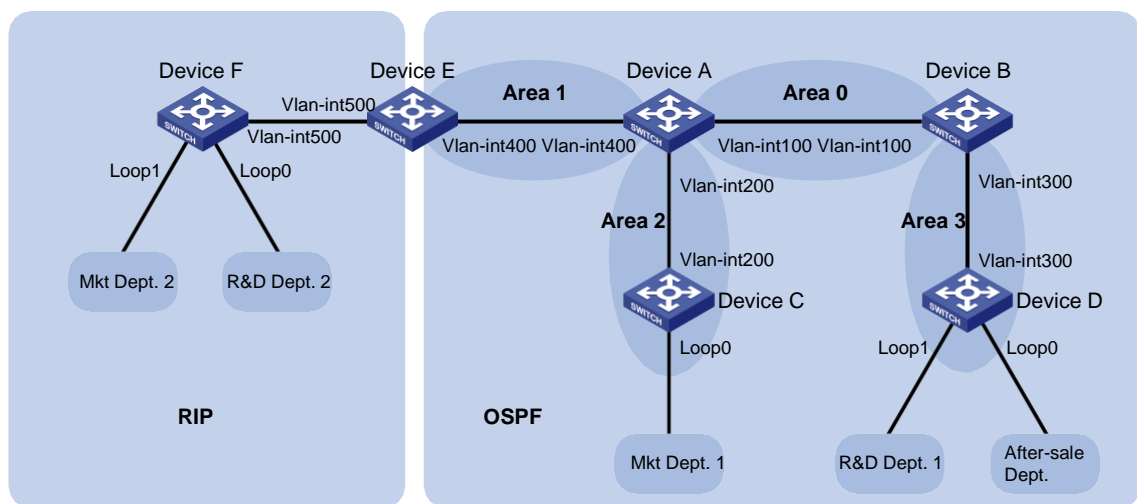
As shown in [Figure 1](#), the devices of an enterprise reside in OSPF and RIP domains.

Configure route redistribution between OSPF and RIP to interconnect the devices.

Configure route filtering on Device E, Device C, and Device D to meet the following requirements:

- The route destined for R&D department 2 is not redistributed to OSPF.
- Marketing department 1 cannot reach R&D department 1.
- R&D department 1 and the After-sale service department cannot reach Marketing department 2.

**Figure 1 Network diagram**



**Table 1 Interface and IP address assignment**

Device	Interface	IP address	Device	Interface	IP address
Device A	Vlan-int100	10.1.1.1/24	Device B	Vlan-int100	10.1.1.2/24
	Vlan-int200	10.2.1.1/24		Vlan-int300	10.3.1.1/24

Device	Interface	IP address	Device	Interface	IP address
	Vlan-int400	10.4.1.1/24			
Device C	Vlan-int200	10.2.1.2/24	Device D	Vlan-int300	10.3.1.2/24
	Loop0	192.168.3.1/24		Loop0	192.168.1.1/24
				Loop1	192.168.2.1/24
Device E	Vlan-int400	10.4.1.2/24	Device F	Vlan-int500	10.5.1.2/24
	Vlan-int500	10.5.1.1/24		Loop0	192.168.4.1/24
				Loop1	192.168.5.1/24

## 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
SC 5520 switch series	Release 63xx, Release 65xx, Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Release 11xx
SC 3570 switch series	Release 11xx
SC 3130 switch series	Release 63xx

# Restrictions and guidelines

When you configure OSPF route filtering, follow these restrictions and guidelines:

- The **filter-policy export** command that filters redistributed routes takes effect only on an ASBR.
- OSPF filters routes calculated using received LSAs. It does not filter LSAs.
- IP communication is bidirectional. If a router filters out a route destined for Network A, the subnets attached to the router cannot reach Network A, and Network A cannot reach the subnets.
- When you configure route filtering by referencing an ACL, configure the **rule permit source any** item following multiple **rule deny source** items to allow unmatched routes to pass.

## Procedures

### Configuring IP addresses

# Configure an IP address for VLAN-interface 100.

```
<DeviceA> system-view
[DeviceA] interface vlan-interface 100
[DeviceA-Vlan-interface100] ip address 10.1.1.1 24
```

# Configure IP addresses for other interfaces in the same way VLAN-interface 100 is configured. (Details not shown.)

### Configuring OSPF

# Enable OSPF on Device A.

```
<DeviceA> system-view
[DeviceA] ospf
[DeviceA-ospf-1] 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] quit
[DeviceA-ospf-1] area 2
[DeviceA-ospf-1-area-0.0.0.2] network 10.2.1.0 0.0.0.255
[DeviceA-ospf-1-area-0.0.0.2] quit
[DeviceA-ospf-1] area 1
[DeviceA-ospf-1-area-0.0.0.1] network 10.4.1.0 0.0.0.255
[DeviceA-ospf-1-area-0.0.0.1] quit
[DeviceA-ospf-1] quit
```

# Enable OSPF on Device B.

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

```
[DeviceB] ospf
[DeviceB-ospf-1] area 0
[DeviceB-ospf-1-area-0.0.0.0] network 10.1.1.0 0.0.0.255
[DeviceB-ospf-1-area-0.0.0.0] quit
[DeviceB-ospf-1] area 3
[DeviceB-ospf-1-area-0.0.0.3] network 10.3.1.0 0.0.0.255
[DeviceB-ospf-1-area-0.0.0.3] quit
[DeviceB-ospf-1] quit
```

#### # Enable OSPF on Device C.

```
<DeviceC> system-view
[DeviceC] ospf
[DeviceC-ospf-1] area 2
[DeviceC-ospf-1-area-0.0.0.2] network 10.2.1.0 0.0.0.255
[DeviceC-ospf-1-area-0.0.0.2] network 192.168.3.0 0.0.0.255
[DeviceC-ospf-1-area-0.0.0.2] quit
[DeviceC-ospf-1] quit
```

#### # Enable OSPF on Device D.

```
<DeviceD> system-view
[DeviceD] ospf
[DeviceD-ospf-1] area 3
[DeviceD-ospf-1-area-0.0.0.3] network 10.3.1.0 0.0.0.255
[DeviceD-ospf-1-area-0.0.0.3] network 192.168.1.0 0.0.0.255
[DeviceD-ospf-1-area-0.0.0.3] network 192.168.2.0 0.0.0.255
[DeviceD-ospf-1-area-0.0.0.3] quit
[DeviceD-ospf-1] quit
```

#### # Enable OSPF on Device E.

```
<DeviceE> system-view
[DeviceE] ospf
[DeviceE-ospf-1] area 1
[DeviceE-ospf-1-area-0.0.0.1] network 10.4.1.0 0.0.0.255
[DeviceE-ospf-1-area-0.0.0.1] quit
[DeviceE-ospf-1] quit
```

## Configuring RIP

#### # Enable RIP on Device E.

```
<DeviceE> system-view
[DeviceE] rip
[DeviceE-rip-1] version 2
[DeviceE-rip-1] undo summary
[DeviceE-rip-1] network 10.5.1.0 0.0.0.255
[DeviceE-rip-1] quit
```

#### # Enable RIP on Device F.

```
<DeviceF> system-view
[DeviceF] rip
[DeviceF-rip-1] version 2
[DeviceF-rip-1] undo summary
```

```
[DeviceF-rip-1] network 10.5.1.0 0.0.0.255
[DeviceF-rip-1] network 192.168.4.0 0.0.0.255
[DeviceF-rip-1] network 192.168.4.0 0.0.0.255
[DeviceF-rip-1] quit
```

## Configuring route redistribution

```
# Configure Device E to redistribute OSPF and direct routes to RIP.
```

```
<DeviceE> system-view
[DeviceE] rip
[DeviceE-rip-1] import-route direct
[DeviceE-rip-1] import-route ospf
[DeviceE-rip-1] quit
```

```
# Configure Device E to redistribute RIP and direct routes to OSPF.
```

```
[DeviceE] ospf
[DeviceE-ospf-1] import-route direct
[DeviceE-ospf-1] import-route rip
[DeviceE-ospf-1] quit
```

```
# Verify that Device E has routes to all networks.
```

```
[DeviceE] display ip routing-table
```

Destinations : 24 Routes : 24

Destination/Mask	Proto	Pre	Cost	NextHop	Interface
0.0.0.0/32	Direct	0	0	127.0.0.1	InLoop0
127.0.0.0/8	Direct	0	0	127.0.0.1	InLoop0
127.0.0.0/32	Direct	0	0	127.0.0.1	InLoop0
127.0.0.1/32	Direct	0	0	127.0.0.1	InLoop0
127.255.255.255/32	Direct	0	0	127.0.0.1	InLoop0
192.168.1.1/32	O_INTER	10	3	10.4.1.1	Vlan400
192.168.2.1/32	O_INTER	10	3	10.4.1.1	Vlan400
192.168.3.1/32	O_INTER	10	2	10.4.1.1	Vlan400
192.168.4.0/24	RIP	100	1	10.5.1.2	Vlan500
192.168.5.0/24	RIP	100	1	10.5.1.2	Vlan500
224.0.0.0/4	Direct	0	0	0.0.0.0	NULL0
224.0.0.0/24	Direct	0	0	0.0.0.0	NULL0
255.255.255.255/32	Direct	0	0	127.0.0.1	InLoop0

# Verify that other devices have routes to all networks. (Details not shown.)

## Configuring OSPF route filtering

# On Device C, configure IPv4 basic ACL 2000 to permit any subnet except 192.168.2.0/24.

```
<DeviceC> system-view
[DeviceC] acl basic 2000
[DeviceC-acl-ipv4-basic-2000] rule 0 deny source 192.168.2.0 0.0.0.255
[DeviceC-acl-ipv4-basic-2000] rule permit source any
[DeviceC-acl-ipv4-basic-2000] quit
```

# On Device C, use ACL 2000 to filter received routes.

```
[DeviceC] ospf
[DeviceC-ospf-1] filter-policy 2000 import
[DeviceC-ospf-1] quit
```

# On Device D, configure IPv4 basic ACL 2000 to permit any subnet except 192.168.5.0/24.

```
<DeviceD> system-view
[DeviceD] acl basic 2000
[DeviceD-acl-ipv4-basic-2000] rule 0 deny source 192.168.5.0 0.0.0.255
[DeviceD-acl-ipv4-basic-2000] rule permit source any
[DeviceD-acl-ipv4-basic-2000] quit
```

# On Device D, use ACL 2000 to filter received routes.

```
[DeviceD] ospf
[DeviceD-ospf-1] filter-policy 2000 import
[DeviceD-ospf-1] quit
```

# On Device E, configure IPv4 basic ACL 2000 to permit any subnet except 192.168.4.0/24.

```
<DeviceE> system-view
[DeviceE] acl basic 2000
[DeviceE-acl-ipv4-basic-2000] rule 0 deny source 192.168.4.0 0.0.0.255
[DeviceE-acl-ipv4-basic-2000] rule permit source any
[DeviceE-acl-ipv4-basic-2000] quit
```

# On Device E, use ACL 2000 to filter routes redistributed from RIP.

```
[DeviceE] ospf
[DeviceE-ospf-1] filter-policy 2000 export rip 1
[DeviceE-ospf-1] quit
```

## Verifying the configuration

# Verify that Device C does not have a route to 192.168.2.0/24.

```
[DeviceC] display ip routing-table
```

```
Destinations : 22          Routes : 22
```

Destination/Mask	Proto	Pre	Cost	NextHop	Interface
0.0.0.0/32	Direct	0	0	127.0.0.1	InLoop0
10.1.1.0/24	O_INTER	10	2	10.2.1.1	Vlan200
10.2.1.0/24	Direct	0	0	10.2.1.2	Vlan200
10.2.1.0/32	Direct	0	0	10.2.1.2	Vlan200

10.2.1.2/32	Direct	0	0	127.0.0.1	InLoop0
10.2.1.255/32	Direct	0	0	10.2.1.2	Vlan200
10.3.1.0/24	O_INTER	10	3	10.2.1.1	Vlan200
10.4.1.0/24	O_INTER	10	2	10.2.1.1	Vlan200
10.5.1.0/24	O_ASE2	150	1	10.2.1.1	Vlan200
127.0.0.0/8	Direct	0	0	127.0.0.1	InLoop0
127.0.0.0/32	Direct	0	0	127.0.0.1	InLoop0
127.0.0.1/32	Direct	0	0	127.0.0.1	InLoop0
127.255.255.255/32	Direct	0	0	127.0.0.1	InLoop0
192.168.1.1/32	O_INTER	10	3	10.2.1.1	Vlan200
192.168.3.0/24	Direct	0	0	192.168.3.1	Loop0
192.168.3.0/32	Direct	0	0	192.168.3.1	Loop0
192.168.3.1/32	Direct	0	0	127.0.0.1	InLoop0
192.168.3.255/32	Direct	0	0	192.168.3.1	Loop0
192.168.5.0/24	O_ASE2	150	1	10.2.1.1	Vlan200
224.0.0.0/4	Direct	0	0	0.0.0.0	NULL0
224.0.0.0/24	Direct	0	0	0.0.0.0	NULL0
255.255.255.255/32	Direct	0	0	127.0.0.1	InLoop0

#### # Verify that Marketing department 1 cannot reach R&D department 1.

```
[DeviceC] ping -a 192.168.3.1 192.168.2.1
Ping 192.168.2.1 (192.168.2.1) from 192.168.3.1: 56 data bytes, press CTRL+C to
break
Request time out
Request time out
Request time out
Request time out
Request time out
```

--- Ping statistics for 192.168.2.1 ---

5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss

#### # Verify that Device D does not have a route to 192.168.5.0/24.

```
[DeviceD] display ip routing-table
```

Destinations : 25                      Routes : 25

Destination/Mask	Proto	Pre	Cost	NextHop	Interface
0.0.0.0/32	Direct	0	0	127.0.0.1	InLoop0
10.1.1.0/24	O_INTER	10	2	10.3.1.1	Vlan300
10.2.1.0/24	O_INTER	10	3	10.3.1.1	Vlan300
10.3.1.0/24	Direct	0	0	10.3.1.2	Vlan300
10.3.1.0/32	Direct	0	0	10.3.1.2	Vlan300
10.3.1.2/32	Direct	0	0	127.0.0.1	InLoop0
10.3.1.255/32	Direct	0	0	10.3.1.2	Vlan300
10.4.1.0/24	O_INTER	10	3	10.3.1.1	Vlan300
10.5.1.0/24	O_ASE2	150	1	10.3.1.1	Vlan300
127.0.0.0/8	Direct	0	0	127.0.0.1	InLoop0
127.0.0.0/32	Direct	0	0	127.0.0.1	InLoop0
127.0.0.1/32	Direct	0	0	127.0.0.1	InLoop0



```

127.255.255.255/32 Direct 0 0 127.0.0.1 InLoop0
192.168.1.0/24 Direct 0 0 192.168.1.1 Loop0
192.168.1.0/32 Direct 0 0 192.168.1.1 Loop0
192.168.1.1/32 Direct 0 0 127.0.0.1 InLoop0
192.168.1.255/32 Direct 0 0 192.168.1.1 Loop0
192.168.2.0/24 Direct 0 0 192.168.2.1 Loop1
192.168.2.0/32 Direct 0 0 192.168.2.1 Loop1
192.168.2.1/32 Direct 0 0 127.0.0.1 InLoop0
192.168.2.255/32 Direct 0 0 192.168.2.1 Loop1
192.168.3.1/32 O_INTER 10 3 10.3.1.1 Vlan300
224.0.0.0/4 Direct 0 0 0.0.0.0 NULL0
224.0.0.0/24 Direct 0 0 0.0.0.0 NULL0
255.255.255.255/32 Direct 0 0 127.0.0.1 InLoop0

```

#### # Verify that the After-sale service department cannot reach Marketing department 2.

```

[DeviceD] ping -a 192.168.1.1 192.168.5.1
Ping 192.168.5.1 (192.168.5.1) from 192.168.1.1: 56 data bytes, press CTRL+C to
break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping statistics for 192.168.5.1 ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss

```

#### # Verify that R&D department 1 cannot reach Marketing department 2.

```

[DeviceD] ping -a 192.168.2.1 192.168.5.1
Ping 192.168.5.1 (192.168.5.1) from 192.168.2.1: 56 data bytes, press CTRL+C to
break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping statistics for 192.168.5.1 ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss

```

The output on Device C and Device D shows that Device E has filtered out the route destined for R&D development 2.

## Configuration files

- Device A:
 

```

#
ospf 1
area 0.0.0.0
network 10.1.1.0 0.0.0.255

```

```

    area 0.0.0.1
network 10.4.1.0 0.0.0.255
area 0.0.0.2
    network 10.2.1.0 0.0.0.255
#
vlan 100
#
vlan 200
#
vlan 400
#
interface Vlan-interface100
    ip address 10.1.1.1 255.255.255.0
#
interface Vlan-interface200
    ip address 10.2.1.1 255.255.255.0
#
interface Vlan-interface400
    ip address 10.4.1.1 255.255.255.0
#

```

- **Device B:**

```

#
ospf 1
    area 0.0.0.0
        network 10.1.1.0 0.0.0.255
    area 0.0.0.3
        network 10.3.1.0 0.0.0.255
#
vlan 100
#
vlan 300
#
interface Vlan-interface100
    ip address 10.1.1.2 255.255.255.0
#
interface Vlan-interface300
    ip address 10.3.1.1 255.255.255.0
#

```

- **Device C:**

```

#
ospf 1
    filter-policy 2000 import
    area 0.0.0.2
        network 10.2.1.0 0.0.0.255
        network 192.168.3.0 0.0.0.255
#
vlan 200
#

```

```

interface LoopBack0
 ip address 192.168.3.1 255.255.255.0
#
interface Vlan-interface200
 ip address 10.2.1.2 255.255.255.0
#
acl basic 2000
 rule 0 deny source 192.168.2.0 0.0.0.255
 rule 5 permit
#

```

- **Device D:**

```

#
ospf 1
 filter-policy 2000 import
 area 0.0.0.3
  network 10.3.1.0 0.0.0.255
  network 192.168.1.0 0.0.0.255
  network 192.168.2.0 0.0.0.255
#
vlan 300
#
interface LoopBack0
 ip address 192.168.1.1 255.255.255.0
#
interface LoopBack1
 ip address 192.168.2.1 255.255.255.0
#
interface Vlan-interface300
 ip address 10.3.1.2 255.255.255.0
#
acl basic 2000
 rule 0 deny source 192.168.5.0 0.0.0.255
 rule 5 permit
#

```

- **Device E:**

```

#
ospf 1
 import-route direct
 import-route rip 1
 filter-policy 2000 export rip 1
 area 0.0.0.1
  network 10.4.1.0 0.0.0.255
#
rip 1
 undo summary
 version 2
 network 10.5.1.0 0.0.0.255
 import-route direct

```

```

import-route ospf 1
#
vlan 400
#
vlan 500
#
interface Vlan-interface400
ip address 10.4.1.2 255.255.255.0
#
interface Vlan-interface500
ip address 10.5.1.1 255.255.255.0
#
acl basic 2000
rule 0 deny source 192.168.4.0 0.0.0.255
rule 5 permit
#

```

- **Device F:**

```

#
rip 1
undo summary
version 2
network 10.5.1.0 0.0.0.255
network 192.168.4.0
network 192.168.5.0
#
vlan 500
#
interface LoopBack0
ip address 192.168.4.1 255.255.255.0
#
interface LoopBack1
ip address 192.168.5.1 255.255.255.0
#
interface Vlan-interface500
ip address 10.5.1.2 255.255.255.0
#

```