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Introduction

This document provides OSPFv3 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 OSPFv3 route filtering.

Example: Configuring OSPFv3 route filtering

Network configuration

As shown in [Figure 1](#), the devices of an enterprise reside in OSPFv3 and RIPng domains.

Configure route redistribution between OSPFv3 and RIPng 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 OSPFv3.
- 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

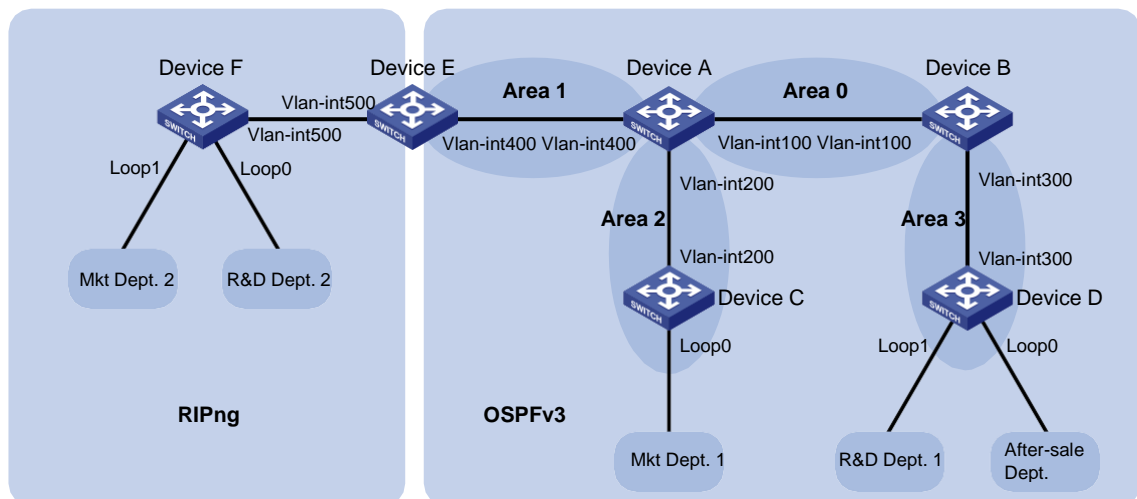


Table 1 Interface and IP address assignment

Device	Interface	IP address	Device	Interface	IP address
Device A	Vlan-int100	1::1/64	Device B	Vlan-int100	1::2/64
	Vlan-int200	2::1/64		Vlan-int300	3::1/64
	Vlan-int400	4::1/64			
Device C	Vlan-int200	2::2/64	Device D	Vlan-int300	3::2/64
	Loop0	13::1/64		Loop0	11::1/64
				Loop1	12::1/64
Device E	Vlan-int400	4::2/64	Device F	Vlan-int500	5::2/64
	Vlan-int500	5::1/64		Loop0	14::1/64
				Loop1	15::1/64

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	Release 11xx
SC 5525 switch series	Release 63xx and Release 65xx
SC 5520 switch series	Release 63xx, Release 65xx, Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Release 11xx
SC 3130 switch series	Release 63xx

Restrictions and guidelines

When you configure OSPFv3 route filtering, follow these restrictions and guidelines:

- The **filter-policy export** command that filters redistributed routes takes effect only on an ASBR.
- OSPFv3 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.
- Specify a Router ID when you configure OSPFv3.

Procedures

Configuring IPv6 addresses

```
# Configure an IPv6 address for VLAN-interface 100.
```

```
<DeviceA> system-view
[DeviceA] interface vlan-interface 100
[DeviceA-Vlan-interface100] ipv6 address 1::1 64
```

Configure IPv6 addresses for other interfaces in the same way VLAN-interface 100 is configured.
(Details not shown.)

Configuring OSPFv3

Enable OSPFv3 on Device A.

```
<DeviceA> system-view
[DeviceA] ospfv3
[DeviceA-ospfv3-1] router-id 6.6.6.6
[DeviceA-ospfv3-1] quit
[DeviceA] interface vlan-interface 100
[DeviceA-Vlan-interface100] ospfv3 1 area 0
[DeviceA-Vlan-interface100] quit
[DeviceA] interface vlan-interface 200
```

```

[DeviceA-Vlan-interface200] ospfv3 1 area 2
[DeviceA-Vlan-interface200] quit
[DeviceA] interface vlan-interface 400
[DeviceA-Vlan-interface400] ospfv3 1 area 1
[DeviceA-Vlan-interface400] quit
# Enable OSPFv3 on Device B.
<DeviceB> system-view
[DeviceB] ospfv3
[DeviceB-ospfv3-1] router-id 5.5.5.5
[DeviceB-ospfv3-1] quit
[DeviceB] interface vlan-interface 100
[DeviceB-Vlan-interface100] ospfv3 1 area 0
[DeviceB-Vlan-interface100] quit
[DeviceB] interface vlan-interface 300
[DeviceB-Vlan-interface300] ospfv3 1 area 3
[DeviceB-Vlan-interface300] quit

```

Enable OSPFv3 on Device C.

```

<DeviceC> system-view
[DeviceC] ospfv3
[DeviceC-ospfv3-1] router-id 4.4.4.4
[DeviceC-ospfv3-1] quit
[DeviceC] interface vlan-interface 200
[DeviceC-Vlan-interface200] ospfv3 1 area 2
[DeviceC-Vlan-interface200] quit
[DeviceC] interface loopback 0
[DeviceC-LoopBack0] ospfv3 1 area 2
[DeviceC-LoopBack0] quit

```

Enable OSPFv3 on Device D.

```

<DeviceD> system-view
[DeviceD] ospfv3
[DeviceD-ospfv3-1] router-id 3.3.3.3
[DeviceD-ospfv3-1] quit
[DeviceD] interface vlan-interface 300
[DeviceD-Vlan-interface300] ospfv3 1 area 3
[DeviceD-Vlan-interface300] quit
[DeviceD] interface loopback 0
[DeviceD-LoopBack0] ospfv3 1 area 3
[DeviceD-LoopBack0] quit
[DeviceD] interface loopback 1
[DeviceD-LoopBack1] ospfv3 1 area 3
[DeviceD-LoopBack1] quit

```

Enable OSPFv3 on Device E.

```

<DeviceE> system-view
[DeviceE] ospfv3
[DeviceE-ospfv3-1] router-id 2.2.2.2
[DeviceE-ospfv3-1] quit
[DeviceE] interface vlan-interface 400
[DeviceE-Vlan-interface400] ospfv3 1 area 1

```

```
[DeviceE-Vlan-interface400] quit
```

Configure RIPng

Enable RIPng on Device E.

```
<DeviceE> system-view
[DeviceE] ripng
[DeviceE-ripng-1] quit
[DeviceE] interface vlan-interface 500
[DeviceE-Vlan-interface500] ripng 1 enable
[DeviceE-Vlan-interface500] quit
```

Enable RIPng on Device F.

```
<DeviceF> system-view
[DeviceF] ripng
[DeviceF-ripng-1] quit
[DeviceF] interface vlan-interface 500
[DeviceF-Vlan-interface500] ripng 1 enable
[DeviceF-Vlan-interface500] quit
[DeviceF] interface loopback 0
[DeviceF-LoopBack0] ripng 1 enable
[DeviceF-LoopBack0] quit
[DeviceF] interface loopback 1
[DeviceF-LoopBack0] ripng 1 enable
[DeviceF-LoopBack0] quit
```

Configuring route redistribution

Configure Device E to redistribute OSPFv3 and direct routes to RIPng.

```
<DeviceE> system-view
[DeviceE] ripng
[DeviceE-ripng-1] import-route direct
[DeviceE-ripng-1] import-route ospfv3
[DeviceE-ripng-1] quit
```

Configure Device E to redistribute RIPng and direct routes to OSPFv3.

```
[DeviceE] ospfv3
[DeviceE-ospfv3-1] import-route direct
[DeviceE-ospfv3-1] import-route ripng
[DeviceE-ospfv3-1] quit
```

Verify that Device E has routes to all networks.

```
[DeviceE] display ipv6 routing-table
```

```
Destinations : 15          Routes : 15
```

Destination: ::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0

Destination: 1::/64	Protocol : OSPFv3
---------------------	-------------------

NextHop	: FE80::2E0:FCFF:FE58:124D	Preference: 10
Interface	: Vlan400	Cost : 2
Destination:	2::/64	Protocol : OSPFv3
NextHop	: FE80::2E0:FCFF:FE58:124D	Preference: 10
Interface	: Vlan400	Cost : 2
Destination:	3::/64	Protocol : OSPFv3
NextHop	: FE80::2E0:FCFF:FE58:124D	Preference: 10
Interface	: Vlan400	Cost : 3
Destination:	4::/64	Protocol : Direct
NextHop	: ::	Preference: 0
Interface	: Vlan400	Cost : 0
Destination:	4::2/128	Protocol : Direct
NextHop	: ::1	Preference: 0
Interface	: InLoop0	Cost : 0
Destination:	5::/64	Protocol : Direct
NextHop	: ::	Preference: 0
Interface	: Vlan500	Cost : 0
Destination:	5::1/128	Protocol : Direct
NextHop	: ::1	Preference: 0
Interface	: InLoop0	Cost : 0
Destination:	11::1/128	Protocol : OSPFv3
NextHop	: FE80::2E0:FCFF:FE58:124D	Preference: 10
Interface	: Vlan400	Cost : 3
Destination:	12::1/128	Protocol : OSPFv3
NextHop	: FE80::2E0:FCFF:FE58:124D	Preference: 10
Interface	: Vlan400	Cost : 3
Destination:	13::1/128	Protocol : OSPFv3
NextHop	: FE80::2E0:FCFF:FE58:124D	Preference: 10
Interface	: Vlan400	Cost : 2
Destination:	14::/64	Protocol : RIPng
NextHop	: FE80::2E0:FCFF:FE11:19B5	Preference: 100
Interface	: Vlan500	Cost : 1
Destination:	15::/64	Protocol : RIPng
NextHop	: FE80::2E0:FCFF:FE11:19B5	Preference: 100
Interface	: Vlan500	Cost : 1
Destination:	FE80::/10	Protocol : Direct

```

NextHop      : ::                               Preference: 0
Interface    : InLoop0                           Cost        : 0

Destination: FF00::/8                             Protocol    : Direct
NextHop      : ::                               Preference: 0
Interface    : NULL0                             Cost        : 0

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

```

Configuring OSPFv3 route filtering

On Device C, configure IPv6 basic ACL 2000 to permit any subnet except 12::1/64.

```

<DeviceC> system-view
[DeviceC] acl ipv6 basic 2000
[DeviceC-acl-ipv6-basic-2000] rule 0 deny source 12::1 64
[DeviceC-acl-ipv6-basic-2000] rule permit source any
[DeviceC-acl-ipv6-basic-2000] quit

```

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

```

[DeviceC] ospfv3
[DeviceC-ospfv3-1] filter-policy 2000 import
[DeviceC-ospfv3-1] quit

```

On Device D, configure IPv6 basic ACL 2000 to permit any subnet except 15::1/64.

```

<DeviceD> system-view
[DeviceD] acl ipv6 basic 2000
[DeviceD-acl-ipv6-basic-2000] rule 0 deny source 15::1 64
[DeviceD-acl-ipv6-basic-2000] rule permit source any
[DeviceD-acl-ipv6-basic-2000] quit

```

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

```

[DeviceD] ospfv3
[DeviceD-ospfv3-1] filter-policy 2000 import
[DeviceD-ospfv3-1] quit

```

On Device E, configure IPv6 basic ACL 2000 to permit any subnet except 14::1/64.

```

<DeviceE> system-view
[DeviceE] acl ipv6 basic 2000
[DeviceE-acl-ipv6-basic-2000] rule 0 deny source 14::1 64
[DeviceE-acl-ipv6-basic-2000] rule permit source any
[DeviceE-acl-ipv6-basic-2000] quit

```

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

```

[DeviceE] ospfv3
[DeviceE-ospfv3-1] filter-policy 2000 export ripng 1
[DeviceE-ospfv3-1] quit

```

Verifying the configuration

Verify that Device C does not have a route to 12::/64.

```

[DeviceC] display ipv6 routing-table

```

```

Destinations : 13          Routes : 13

```


Destination: ::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 1::/64	Protocol : OSPFv3
NextHop : FE80::2E0:FCFF:FE58:1245	Preference: 10
Interface : Vlan200	Cost : 2
Destination: 2::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : Vlan200	Cost : 0
Destination: 2::2/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 3::/64	Protocol : OSPFv3
NextHop : FE80::2E0:FCFF:FE58:1245	Preference: 10
Interface : Vlan200	Cost : 3
Destination: 4::/64	Protocol : OSPFv3
NextHop : FE80::2E0:FCFF:FE58:1245	Preference: 10
Interface : Vlan200	Cost : 2
Destination: 5::/64	Protocol : OSPFv3
NextHop : FE80::2E0:FCFF:FE58:1245	Preference: 150
Interface : Vlan200	Cost : 1
Destination: 11::1/128	Protocol : OSPFv3
NextHop : FE80::2E0:FCFF:FE58:1245	Preference: 10
Interface : Vlan200	Cost : 3
Destination: 13::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : Loop0	Cost : 0
Destination: 13::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 15::/64	Protocol : OSPFv3
NextHop : FE80::2E0:FCFF:FE58:1245	Preference: 150
Interface : Vlan200	Cost : 1
Destination: FE80::/10	Protocol : Direct
NextHop : ::	Preference: 0
Interface : InLoop0	Cost : 0

```

Destination: FF00::/8                                Protocol : Direct
NextHop      : ::                                     Preference: 0
Interface    : NULL0                                  Cost      : 0

```

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

```

[DeviceC] ping ipv6 -a 13::1 12::1
Ping6(56 data bytes) 13::1 --> 12::1, press CTRL+C to break
Request time out
Request time out
Request time out
Request time out
Request time out

```

```

--- Ping6 statistics for 12::1 ---

```

```

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

```

Verify that Device D does not have a route to 15::/64.

```

[DeviceD] display ipv6 routing-table

```

```

Destinations : 14          Routes : 14

```

```

Destination: ::1/128                                Protocol : Direct
NextHop      : ::1                                     Preference: 0
Interface    : InLoop0                                  Cost      : 0

```

```

Destination: 1::/64                                  Protocol : OSPFv3
NextHop      : FE80::2A0:FCFF:FE00:5815              Preference: 10
Interface    : Vlan300                                Cost      : 2

```

```

Destination: 2::/64                                  Protocol : OSPFv3
NextHop      : FE80::2A0:FCFF:FE00:5815              Preference: 10
Interface    : Vlan300                                Cost      : 3

```

```

Destination: 3::/64                                  Protocol : Direct
NextHop      : ::                                     Preference: 0
Interface    : Vlan300                                Cost      : 0

```

```

Destination: 3::2/128                                Protocol : Direct
NextHop      : ::1                                     Preference: 0
Interface    : InLoop0                                  Cost      : 0

```

```

Destination: 4::/64                                  Protocol : OSPFv3
NextHop      : FE80::2A0:FCFF:FE00:5815              Preference: 10
Interface    : Vlan300                                Cost      : 3

```

```

Destination: 5::/64                                  Protocol : OSPFv3
NextHop      : FE80::2A0:FCFF:FE00:5815              Preference: 150
Interface    : Vlan300                                Cost      : 1

```

```

Destination: 11::/64                                Protocol : Direct
NextHop      : ::                                    Preference: 0
Interface    : Loop0                                Cost      : 0

Destination: 11::1/128                              Protocol : Direct
NextHop      : ::1                                  Preference: 0
Interface    : InLoop0                              Cost      : 0

Destination: 12::/64                                Protocol : Direct
NextHop      : ::                                    Preference: 0
Interface    : Loop1                                Cost      : 0

Destination: 12::1/128                              Protocol : Direct
NextHop      : ::1                                  Preference: 0
Interface    : InLoop0                              Cost      : 0

Destination: 13::1/128                              Protocol : OSPFv3
NextHop      : FE80::2A0:FCFF:FE00:5815             Preference: 10
Interface    : Vlan300                              Cost      : 3

Destination: FE80::/10                              Protocol : Direct
NextHop      : ::                                    Preference: 0
Interface    : NULL0                                Cost      : 0

Destination: FF00::/8                                Protocol : Direct
NextHop      : ::                                    Preference: 0
Interface    : NULL0                                Cost      : 0

```

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

```

[DeviceD] ping ipv6 -a 11::1 15::1
Ping6(56 data bytes) 11::1 --> 15::1, press CTRL+C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping6 statistics for 15::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 ipv6 -a 12::1 15::1
Ping6(56 data bytes) 12::1 --> 15::1, press CTRL+C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping6 statistics for 15::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:**

```
#
ospfv3 1
  router-id 6.6.6.6
  area 0.0.0.0
  area 0.0.0.1
  area 0.0.0.2
#
vlan 100
#
vlan 200
#
vlan 400
#
interface Vlan-interface100
  ospfv3 1 area 0.0.0.0
  ipv6 address 1::1/64
#
interface Vlan-interface200
  ospfv3 1 area 0.0.0.2
  ipv6 address 2::1/64
#
interface Vlan-interface400
  ospfv3 1 area 0.0.0.1
  ipv6 address 4::1/64
#
```

- **Device B:**

```
#
ospfv3 1
  router-id 5.5.5.5
  area 0.0.0.0
  area 0.0.0.3
#
vlan 100
#
vlan 300
#
interface Vlan-interface100
  ospfv3 1 area 0.0.0.0
  ipv6 address 1::2/64
#
interface Vlan-interface300
```

- ```

ospfv3 1 area 0.0.0.3
ipv6 address 3::1/64
#

```
- **Device C:**

```

#
ospfv3 1
router-id 4.4.4.4
filter-policy 2000 import
area 0.0.0.2
#
vlan 200
#
interface LoopBack0
ospfv3 1 area 0.0.0.2
ipv6 address 13::1/64
#
interface Vlan-interface200
ospfv3 1 area 0.0.0.2
ipv6 address 2::2/64
#
acl ipv6 basic 2000
rule 0 deny source 12::/64
rule 5 permit
#

```
  - **Device D:**

```

#
ospfv3 1
router-id 3.3.3.3
filter-policy 2000 import
area 0.0.0.3
#
vlan 300
#
interface LoopBack0
ospfv3 1 area 0.0.0.3
ipv6 address 11::1/64
#
interface LoopBack1
ospfv3 1 area 0.0.0.3
ipv6 address 12::1/64
#
interface Vlan-interface300
ospfv3 1 area 0.0.0.3
ipv6 address 3::2/64
#
acl ipv6 basic 2000
rule 0 deny source 15::/64
rule 5 permit

```

- #
- **Device E:**
  - #
  - ospfv3 1
    - router-id 2.2.2.2
    - import-route direct
  - import-route ripng 1
    - filter-policy 2000 export ripng 1
    - area 0.0.0.1
  - #
  - ripng 1
    - import-route direct
    - import-route ospfv3 1
  - #
  - vlan 400
  - #
  - vlan 500
  - #
  - interface Vlan-interface400
    - ospfv3 1 area 0.0.0.1
    - ipv6 address 4::2/64
  - #
  - interface Vlan-interface500
    - ipv6 address 5::1/64
    - ripng 1 enable
  - #
  - acl ipv6 basic 2000
    - rule 0 deny source 14::/64
    - rule 5 permit
  - #
- **Device F:**
  - #
  - ripng 1
  - #
  - vlan 500
  - #
  - interface LoopBack0
    - ipv6 address 14::1/64
    - ripng 1 enable
  - #
  - interface LoopBack1
    - ipv6 address 15::1/64
    - ripng 1 enable
  - #
  - interface Vlan-interface500
    - ipv6 address 5::2/64
    - ripng 1 enable
  - #

