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Introduction

This document provides examples for configuring Layer 3 multicast on a DR system attached to multicast sources.

Distributed Resilient Network Interconnect (DRNI) virtualizes two physical devices into one system through multichassis link aggregation. You can configure PIM on a DR system attached to multicast receivers or multicast sources to prevent single points of failure from interrupting multicast forwarding.

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 DRNI and Layer 3 multicast.

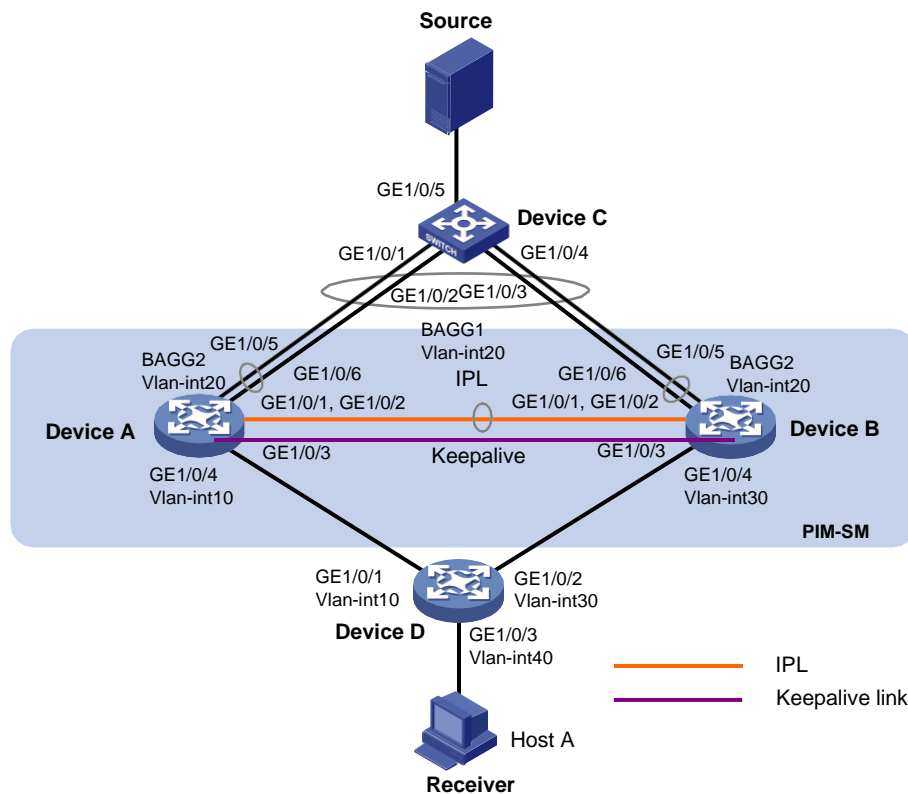
Example: Configuring Layer 3 IPv4 multicast on a DR system attached to multicast sources

Network configuration

As shown in [Figure 1](#):

- OSPF runs on the network.
- VOD streams are sent to receiver hosts in multicast. The receivers of different subnets form stub networks, and a minimum of one receiver host exist on each stub network.
- The entire PIM-SM domain contains only one BSR.
- Device C is a Layer 2 device attached to the multicast source. Switch A and Switch B are virtualized into a DR system, which is connected to Switch C through a multichassis aggregate link. VLAN-interface 20 interfaces on the DR system are the gateway for the multicast source.
- Host A is a multicast data receiver attached to Device D.
- The GigabitEthernet 1/0/3 interfaces on Device A and Device B are excluded from the shutdown action by DRNI MAD to set up the keepalive link.
- A VRRP group is configured on VLAN-interface 20 interfaces. In the VRRP group, Device A is the master.
- DR interfaces on Switch A and Switch B permit packets from VLAN 20 to pass through. PIM is enabled on VLAN-interface 20 of Switch A and Switch B.
- IP multicast routing is enabled on Switch A and Switch B.

Figure 1 Network diagram



Device	Interface	IP address	Device	Interface	IP address
Device A	Vlan-int20	20.0.0.1/24	Device D	Vlan-int10	100.0.0.2/24
	GE1/0/3	200.0.0.1/24		Vlan-int30	30.0.0.2/24
	Vlan-int10	100.0.0.1/24		Vlan-int40	40.0.0.2/24
	Loop0	1.1.1.1			
Device B	Vlan-int20	20.0.0.2/24			
	GE1/0/3	200.0.0.2/24			
	Vlan-int30	30.0.0.1/24			
	Loop0	2.2.2.2			

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 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx

Procedures

Assigning IP addresses and configuring unicast routing

Assign an IP address and subnet mask to each interface as shown in [Figure 1](#), and configure OSPF on the switches in the PIM-SM domain. (Details not shown.)

Configuring Device A

Configure the DR system settings.

```
<DeviceA> system-view
[DeviceA] drni system-mac 1-1-1
[DeviceA] drni system-number 1
[DeviceA] drni system-priority 123
```

Configure DR keepalive packet parameters.

```
[DeviceA] drni keepalive ip destination 200.0.0.2 source 200.0.0.1
```

Exclude the interface used for DR keepalive detection (GigabitEthernet 1/0/3) from the shutdown action by DRNI MAD.

```
[DeviceA] drni mad exclude interface gigabitethernet 1/0/3
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 1.

```
[DeviceA] interface bridge-aggregation 1
[DeviceA-Bridge-Aggregation1] link-aggregation mode dynamic
[DeviceA-Bridge-Aggregation1] quit
```

Assign GigabitEthernet 1/0/1 and GigabitEthernet 1/0/2 to aggregation group 1.

```
[DeviceA] interface gigabitethernet 1/0/1
[DeviceA-GigabitEthernet1/0/1] port link-aggregation group 1
[DeviceA-GigabitEthernet1/0/1] quit
[DeviceA] interface gigabitethernet 1/0/2
[DeviceA-GigabitEthernet1/0/2] port link-aggregation group 1
[DeviceA-GigabitEthernet1/0/2] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 2.

```
[DeviceA] interface bridge-aggregation 2
[DeviceA-Bridge-Aggregation2] link-aggregation mode dynamic
[DeviceA-Bridge-Aggregation2] quit
```

Assign GigabitEthernet 1/0/5 and GigabitEthernet 1/0/6 to aggregation group 1.

```
[DeviceA] interface gigabitethernet 1/0/5
[DeviceA-GigabitEthernet1/0/5] port link-aggregation group 2
[DeviceA-GigabitEthernet1/0/5] quit
[DeviceA] interface gigabitethernet 1/0/6
[DeviceA-GigabitEthernet1/0/6] port link-aggregation group 2
[DeviceA-GigabitEthernet1/0/6] quit
```

Configure Bridge-Aggregation 1 as a trunk port, assign it to all VLANs, and specify it as the IPP.

```
[DeviceA] interface bridge-aggregation 1
[DeviceA-Bridge-Aggregation1] port link-type trunk
[DeviceA-Bridge-Aggregation1] port trunk permit vlan all
[DeviceA-Bridge-Aggregation1] port drni intra-portal-port 1
[DeviceA-Bridge-Aggregation1] quit
```

Configure Bridge-Aggregation 2 as a trunk port, and assign it to VLAN 20 and a DR group.

```
[DeviceA] interface bridge-aggregation 2
[DeviceA-Bridge-Aggregation2] port link-type trunk
[DeviceA-Bridge-Aggregation2] port trunk permit vlan 20
[DeviceA-Bridge-Aggregation2] port drni group 1
[DeviceA-Bridge-Aggregation2] quit
```

Configure VRRP group 1 on VLAN-interface 20, and set the priority of Device A to 200 for it to be the master in the VRRP group.

```
[DeviceA] vlan 20
[DeviceA-vlan20] quit
[DeviceA] interface vlan-interface 20
[DeviceA-Vlan-interface20] vrrp vrid 1 virtual-ip 20.0.0.10
[DeviceA-Vlan-interface20] vrrp vrid 1 priority 200
[DeviceA-Vlan-interface20] quit
```

Enable IP multicast routing, enable IGMP and PIM on VLAN-interface 10, and enable PIM-SM on other interfaces as required.

```

[DeviceA] multicast routing
[DeviceA-mrib] quit
[DeviceA] interface vlan-interface 10
[DeviceA-Vlan-interface10] igmp enable
[DeviceA-Vlan-interface10] pim sm
[DeviceA-Vlan-interface10] quit
[DeviceA] interface vlan-interface 20
[DeviceA-Vlan-interface20] pim sm
[DeviceA-Vlan-interface20] quit
[DeviceA] interface loopback 0
[DeviceA-LoopBack0] pim sm
[DeviceA-LoopBack0] quit

# Specify the IP address of Loopback 0 as a C-RP and a C-BSR.
[DeviceA] pim
[DeviceA-pim] c-rp 1.1.1.1
[DeviceA-pim] c-bsr 1.1.1.1
[DeviceA-pim] quit

```

Configuring Device B

Configure Device B in the same way you configure Device A. (Details not shown.)

Configuring Device C

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 1.

```

<DeviceC> system-view
[DeviceC] interface bridge-aggregation 1
[DeviceC-Bridge-Aggregation1] link-aggregation mode dynamic
[DeviceC-Bridge-Aggregation1] quit

```

Assign GigabitEthernet 1/0/1 through GigabitEthernet 1/0/4 to aggregation group 1.

```

[DeviceC] interface range gigabitethernet 1/0/1 to gigabitethernet 1/0/4
[DeviceC-if-range] port link-aggregation group 1
[DeviceC-if-range] quit

```

Configure Bridge-Aggregation 2 as a trunk port, and assign it to VLAN 20.

```

[DeviceC] interface bridge-aggregation 1
[DeviceC-Bridge-Aggregation1] port link-type trunk
[DeviceC-Bridge-Aggregation1] port trunk permit vlan 20
[DeviceC-Bridge-Aggregation1] quit

```

Assign GigabitEthernet 1/0/5 to VLAN 20.

```

[DeviceC] interface gigabitethernet 1/0/5
[DeviceC-GigabitEthernet1/0/5] port access vlan 20
[DeviceC-GigabitEthernet1/0/5] quit

```

Configuring Device D

Assign GigabitEthernet 1/0/1, GigabitEthernet 1/0/2, and GigabitEthernet 1/0/3 to VLAN 10, VLAN 30, and VLAN 40, respectively.

```

<DeviceD> system-view

```

```

[DeviceD] vlan 10
[DeviceD-vlan10] quit
[DeviceD] interface gigabitethernet1/0/1
[DeviceD-GigabitEthernet1/0/1] port access vlan 10
[DeviceD-GigabitEthernet1/0/1] quit
[DeviceD] vlan 40
[DeviceD-vlan40] quit
[DeviceD] interface gigabitethernet1/0/3
[DeviceD-GigabitEthernet1/0/3] port access vlan 40
[DeviceD] vlan 30
[DeviceD-vlan30] quit
[DeviceD] interface gigabitethernet1/0/2
[DeviceD-GigabitEthernet1/0/2] port access vlan 30

# Enable IP multicast routing, and enable PIM-SM on VLAN-interface 10 and VLAN-interface 30.
[DeviceD] multicast routing
[DeviceD-mrib] quit
[DeviceD] interface vlan-interface 10
[DeviceD-Vlan-interface10] pim sm
[DeviceD-Vlan-interface10] quit
[DeviceD] vlan 30
[DeviceD-vlan30] quit
[DeviceD] interface vlan-interface 30
[DeviceD-Vlan-interface10] pim sm
[DeviceD-Vlan-interface10] quit

# Enable IGMPv2 on VLAN-interface 40.
[DeviceD] interface vlan-interface 40
[DeviceD-Vlan-interface40] igmp enable
[DeviceD-Vlan-interface40] igmp version 2
[DeviceD-Vlan-interface40] quit

```

Verifying the configuration

Verify that Device B sends and receives keepalive packets correctly.

```

<DeviceB> display drni keepalive
Neighbor keepalive link status (cause): Up
Neighbor is alive for: 176 s 237 ms
Keepalive packet transmission status:
  Sent: Successful
  Received: Successful
Last received keepalive packet information:
  Source IP address: 200.0.0.1
  Time: 2021/12/21 15:12:43
  Action: Accept

```

```

Distributed relay keepalive parameters:
Destination IP address: 200.0.0.1
Source IP address: 200.0.0.2
Keepalive UDP port : 6400

```

Keepalive VPN name : N/A
Keepalive interval : 1000 ms
Keepalive timeout : 5 sec
Keepalive hold time: 3 sec

Verify that interfaces used by DRNI operate correctly on Device B.

<DeviceB> display drni summary

Flags: A -- Aggregate interface down, B -- No peer DR interface configured
C -- Configuration consistency check failed

IPP: BAGG1

IPP state (cause): UP

Keepalive link state (cause): UP

DR interface information

DR interface	DR group	Local state (cause)	Peer state	Remaining down time(s)
BAGG2	1	UP	UP	-

Verify that the DR interface on Device B operates correctly.

<DeviceB> display link-aggregation verbose bridge-aggregation 2

Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing

Port Status: S -- Selected, U -- Unselected, I -- Individual

Port: A -- Auto port, M -- Management port, R -- Reference port

Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
D -- Synchronization, E -- Collecting, F -- Distributing,
G -- Defaulted, H -- Expired

Aggregate Interface: Bridge-Aggregation2

Creation Mode: Manual

Aggregation Mode: Dynamic

Loadsharing Type: Shar

Management VLANs: None

System ID: 0x7b, 0001-0001-0001

Local:

Port	Status	Priority	Index	Oper-Key	Flag
GE1/0/5(R)	S	32768	32770	40001	{ACDEF}
GE1/0/6	S	32768	32770	40001	{ACDEF}

Remote:

Actor	Priority	Index	Oper-Key	SystemID	Flag
GE1/0/5	32768	2	1	0x8000, 84c4-42e5-0300	{ACDEF}
GE1/0/6	32768	2	1	0x8000, 84c4-42e5-0300	{ACDEF}

Verify that the IGMP group information on Device D is correct.

<DeviceD> display igmp group

IGMP groups in total: 1

Vlan-interface40(40.0.0.2):

IGMP groups reported in total: 1

Group address	Last reporter	Uptime	Expires
225.0.0.1	40.0.0.10	00:02:04	00:01:15

Verify that PIM routing entries have been created on Device B.


```

<DeviceB> display pim routing-table
Total 1 (*, G) entries; 1 (S, G) entries

(*, 225.0.0.1)
  RP: 2.2.2.2 (local)
  Protocol: pim-sm, Flag: WC
  UpTime: 00:00:20
  Upstream interface: Register-Tunnel0
    Upstream neighbor: NULL
    RPF prime neighbor: NULL
  Downstream interface information:
  Total number of downstream interfaces: 1
    1: Vlan-interface30
      Protocol: pim-sm, UpTime: 00:00:20, Expires: -

(20.0.0.100, 225.0.0.1)
  RP: 2.2.2.2 (local)
  Protocol: pim-sm, Flag: SPT ACT 2MVPN
  UpTime: 00:00:19
  Upstream interface: Vlan-interface20
    Upstream neighbor: NULL
    RPF prime neighbor: NULL
  Downstream interface information:
  Total number of downstream interfaces: 1
    1: Vlan-interface30
      Protocol: pim-sm, UpTime: 00:00:19, Expires: -

```

Verify that multicast forwarding entries have been created on Device B.

```

<DeviceB> display multicast forwarding-table
Total 1 entries, 1 matched

00001. (20.0.0.100, 225.0.0.1)
  Flags: 0x0
  Uptime: 00:00:55, Timeout in: 00:03:18
  Incoming interface: Vlan-interface20
  List of 1 outgoing interfaces:
    1: Vlan-interface30
  Matched 1293 packets(36204 bytes), Wrong If 0 packets
  Forwarded 1291 packets(36148 bytes)

```

Verify that Device A does not create PIM routing entries or multicast forwarding entries, which indicates that Device B forwards all multicast traffic to the receiver. (Details not shown.)

Configuration files

- Device A:


```

#
sysname DeviceA
#
ospf 1

```

```

router-id 2.2.2.2
area 0.0.0.0
#
vlan 1
#
vlan 10
#
vlan 20
#
interface Bridge-Aggregation1
port link-type trunk
port trunk permit vlan all
link-aggregation mode dynamic
port drni intra-portal-port 1
#
interface Bridge-Aggregation2
port link-type trunk
port trunk permit vlan 1 20
link-aggregation mode dynamic
port drni group 1
#
interface LoopBack0
ospf 1 area 0.0.0.0
pim sm
ip address 1.1.1.1 255.255.255.255
#
interface Vlan-interface10
ospf 1 area 0.0.0.0
pim sm
ip address 100.0.0.1 255.255.255.0
#
interface Vlan-interface20
ospf 1 area 0.0.0.0
pim sm
ip address 20.0.0.1 255.255.255.0
vrrp vrid 1 virtual-ip 20.0.0.10
vrrp vrid 1 priority 200
#
interface GigabitEthernet1/0/3
ip address 200.0.0.1 255.255.255.0
#
interface GigabitEthernet1/0/5
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 2
#
interface GigabitEthernet1/0/6
port link-type trunk

```

```

port trunk permit vlan 1 20
port link-aggregation group 2
#
interface GigabitEthernet1/0/4
port access vlan 10
#
interface GigabitEthernet1/0/1
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1
#
interface GigabitEthernet1/0/2
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1
#
multicast routing
#
pim
c-bsr 1.1.1.1
c-rp 1.1.1.1
#
drni system-mac 0001-0001-0001
drni system-number 1
drni system-priority 123
drni keepalive ip destination 200.0.0.2 source 200.0.0.1
drni mad exclude interface GigabitEthernet1/0/3
#

```

- **Device B:**

```

#
sysname DeviceB
#
ospf 1
router-id 3.3.3.3
area 0.0.0.0
area 0.0.0.9
#
vlan 20
#
vlan 30
#
interface Bridge-Aggregation1
port link-type trunk
port trunk permit vlan all
link-aggregation mode dynamic
port drni intra-portal-port 1
#
interface Bridge-Aggregation2

```

```

port link-type trunk
port trunk permit vlan 1 20
link-aggregation mode dynamic
port drni group 1
#
interface LoopBack0
  ospf 1 area 0.0.0.0
  pim sm
  ip address 2.2.2.2/32
#
interface Vlan-interface20
  ospf 1 area 0.0.0.0
  pim sm
  ip address 20.0.0.2 255.255.255.0
  vrrp vrid 1 virtual-ip 20.0.0.10
  vrrp vrid 1 priority 100
#
interface Vlan-interface30
  ospf 1 area 0.0.0.0
  pim sm
  ip address 30.0.0.1 255.255.255.0
#
interface GigabitEthernet1/0/3
  ospf 1 area 0.0.0.0
  ip address 200.0.0.2 255.255.255.0
#
interface GigabitEthernet1/0/5
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 2
#
interface GigabitEthernet1/0/6
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 2
#
interface GigabitEthernet1/0/4
  port access vlan 30
#
interface GigabitEthernet1/0/1
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 1
#
interface GigabitEthernet1/0/2
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 1

```

```

#
multicast routing
#
pim
  c-bsr 1.1.1.1
  c-rp 1.1.1.1
#
  drni system-mac 0001-0001-0001
  drni system-number 2
  drni system-priority 123
  drni keepalive ipv6 destination 200.0.0.1 source 200.0.0.2
  drni mad exclude interface GigabitEthernet1/0/3
#
• Device C:
#
  sysname DeviceC
#
  vlan 1
#
  vlan 20
#
  interface LoopBack1
    ip address 3.3.3.3 255.255.255.255
#
  interface Bridge-Aggregation1
    port link-type trunk
    port trunk permit vlan 1 20
    link-aggregation mode dynamic
#
  interface GigabitEthernet1/0/5
    port access vlan 20
#
  interface GigabitEthernet1/0/1
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 1
#
  interface GigabitEthernet1/0/2
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 1
#
  interface GigabitEthernet1/0/3
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 1
#
  interface GigabitEthernet1/0/4

```

```

port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1

```

- **Device D:**

```

#
 sysname DeviceD
#
ospf 1
 router-id 4.4.4.4
 area 0.0.0.0
#
vlan 10
#
vlan 40
#
vlan 30
#
interface Vlan-interface10
 ospf 1 area 0.0.0.0
 pim sm
 ip address 100.0.0.2 255.255.255.0
#
interface Vlan-interface40
 ospf 1 area 0.0.0.0
 ip address 40.0.0.2 255.255.255.0
 igmp enable
 igmp version 2
#
interface Vlan-interface30
 ospf 1 area 0.0.0.0
 pim sm
 ip address 30.0.0.2 255.255.255.0
#
interface GigabitEthernet1/0/3
 port access vlan 40
#
interface GigabitEthernet1/0/1
 port access vlan 10
#
interface GigabitEthernet1/0/2
 port access vlan 30
#
multicast routing
#

```

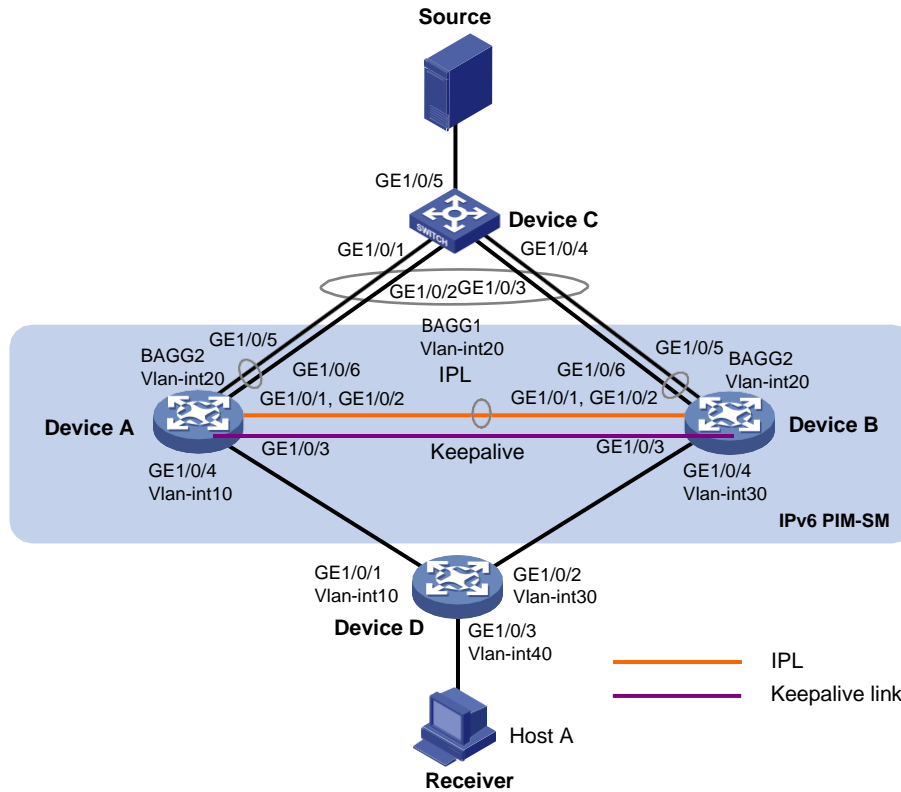
Example: Configuring Layer 3 IPv6 multicast on a DR system attached to multicast sources

Network configuration

As shown in [Figure 2](#):

- OSPFv3 runs on the network.
- VOD streams are sent to receiver hosts in multicast. The receivers of different subnets form stub networks, and a minimum of one receiver host exist on each stub network.
- The entire IPv6 PIM-SM domain contains only one BSR.
- Device C is a Layer 2 device attached to the multicast source. Switch A and Switch B are virtualized into a DR system, which is connected to Switch C through a multichassis aggregate link. VLAN-interface 20 interfaces on the DR system are the gateway for the multicast source.
- Host A is a multicast data receiver attached to Device D.
- The GigabitEthernet 1/0/3 interfaces on Device A and Device B are excluded from the shutdown action by DRNI MAD to set up the keepalive link.
- A VRRP group is configured on VLAN-interface 20 interfaces. In the VRRP group, Device A is the master.
- DR interfaces on Switch A and Switch B permit packets from VLAN 20 to pass through. PIM is enabled on VLAN-interface 20 of Switch A and Switch B.
- IPv6 multicast routing is enabled on Switch A and Switch B.

Figure 2 Network diagram



Device	Interface	IP address	Device	Interface	IP address
Device A	Vlan-int20	2000::1/80	Device D	Vlan-int10	2003::2/80
	GE1/0/3	2002::1/80		Vlan-int30	2004::2/80
	Vlan-int10	2003::1/80		Vlan-int40	20::1/80
	Loop0	1111::1111/128			
Device B	Vlan-int20	2000::2/80			
	GE1/0/3	2002::2/80			
	Vlan-int30	2004::1/80			
	Loop0	2222::2222/128			

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 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3570 switch series	Not supported
SC 3130 switch series	Not supported

Procedures

Assigning IPv6 addresses and configuring unicast routing

Assign an IPv6 address and prefix to each interface as shown in [Figure 2](#), and configure OSPFv3 on the switches in the IPv6 PIM-SM domain. (Details not shown.)

Configuring Device A

Configure the DR system settings.

```
<DeviceA> system-view
[DeviceA] drni system-mac 1-1-1
[DeviceA] drni system-number 1
[DeviceA] drni system-priority 123
```

Configure DR keepalive packet parameters.

```
[DeviceA] drni keepalive ipv6 destination 2002::2 source 2002::1
```

Exclude the interface used for DR keepalive detection (GigabitEthernet 1/0/3) from the shutdown action by DRNI MAD.

```
[DeviceA] drni mad exclude interface gigabitethernet 1/0/3
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 1.

```
[DeviceA] interface bridge-aggregation 1
[DeviceA-Bridge-Aggregation1] link-aggregation mode dynamic
[DeviceA-Bridge-Aggregation1] quit
```

Assign GigabitEthernet 1/0/1 and GigabitEthernet 1/0/2 to aggregation group 1.

```
[DeviceA] interface gigabitethernet 1/0/1
[DeviceA-GigabitEthernet1/0/1] port link-aggregation group 1
[DeviceA-GigabitEthernet1/0/1] quit
[DeviceA] interface gigabitethernet 1/0/2
[DeviceA-GigabitEthernet1/0/2] port link-aggregation group 1
[DeviceA-GigabitEthernet1/0/2] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 2.

```
[DeviceA] interface bridge-aggregation 2
[DeviceA-Bridge-Aggregation2] link-aggregation mode dynamic
[DeviceA-Bridge-Aggregation2] quit
```

Assign GigabitEthernet 1/0/5 and GigabitEthernet 1/0/6 to aggregation group 1.

```
[DeviceA] interface gigabitethernet 1/0/5
[DeviceA-GigabitEthernet1/0/5] port link-aggregation group 2
[DeviceA-GigabitEthernet1/0/5] quit
[DeviceA] interface gigabitethernet 1/0/6
[DeviceA-GigabitEthernet1/0/6] port link-aggregation group 2
[DeviceA-GigabitEthernet1/0/6] quit
```

Configure Bridge-Aggregation 1 as a trunk port, assign it to all VLANs, and specify it as the IPP.

```
[DeviceA] interface bridge-aggregation 1
[DeviceA-Bridge-Aggregation1] port link-type trunk
[DeviceA-Bridge-Aggregation1] port trunk permit vlan all
[DeviceA-Bridge-Aggregation1] port drni intra-portal-port 1
[DeviceA-Bridge-Aggregation1] quit
```

Configure Bridge-Aggregation 2 as a trunk port, assign it to VLAN 20, and assign it to a DR group.

```
[DeviceA] interface bridge-aggregation 2
[DeviceA-Bridge-Aggregation2] port link-type trunk
[DeviceA-Bridge-Aggregation2] port trunk permit vlan 20
[DeviceA-Bridge-Aggregation2] port drni group 1
[DeviceA-Bridge-Aggregation2] quit
```

Configure VRRP group 1 on VLAN-interface 20, and set the priority of Device A to 200 for it to become the master in the VRRP group.

```
[DeviceA] interface vlan-interface 20
[DeviceA-Vlan-interface20] vrrp ipv6 vrid 1 virtual-ip FE80::10 link-local
[DeviceA-Vlan-interface20] vrrp ipv6 vrid 1 virtual-ip 2000::10
[DeviceA-Vlan-interface20] vrrp ipv6 vrid 1 priority 200
[DeviceA-Vlan-interface20] quit
```

Enable IPv6 multicast routing, enable MLD and IPv6 PIM on VLAN-interface 10, and enable IPv6 PIM-SM on other interfaces as required.

```
[DeviceA] ipv6 multicast routing
[DeviceA-mrib6] quit
[DeviceA] interface vlan-interface 10
[DeviceA-Vlan-interface10] mld enable
```

```

[DeviceA-Vlan-interface10] ipv6 pim sm
[DeviceA-Vlan-interface10] quit
[DeviceA] interface vlan-interface 20
[DeviceA-Vlan-interface20] ipv6 pim sm
[DeviceA-Vlan-interface20] quit
[DeviceA] interface loopback 0
[DeviceA-LoopBack0] ipv6 pim sm
[DeviceA-LoopBack0] quit

# Specify the IPv6 address of Loopback 0 as a C-RP and a C-BSR.
[DeviceA] ipv6 pim
[DeviceA-pim6] c-rp 1111::1111
[DeviceA-pim6] c-bsr 1111::1111
[DeviceA-pim6] quit

```

Configuring Device B

Configure Device B in the same way you configure Device A. (Details not shown.)

Configuring Device C

```

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 1.
<DeviceC> system-view
[DeviceC] interface bridge-aggregation 1
[DeviceC-Bridge-Aggregation1] link-aggregation mode dynamic
[DeviceC-Bridge-Aggregation1] quit

# Assign GigabitEthernet 1/0/1 through GigabitEthernet 1/0/4 to aggregation group 1.
[DeviceC] interface range gigabitethernet 1/0/1 to gigabitethernet 1/0/4
[DeviceC-if-range] port link-aggregation group 1
[DeviceC-if-range] quit

# Configure Bridge-Aggregation 2 as a trunk port, and assign it to VLAN 20.
[DeviceC] interface bridge-aggregation 1
[DeviceC-Bridge-Aggregation1] port link-type trunk
[DeviceC-Bridge-Aggregation1] port trunk permit vlan 20
[DeviceC-Bridge-Aggregation1] quit

# Assign GigabitEthernet 1/0/5 to VLAN 20.
[DeviceC] interface gigabitethernet 1/0/5
[DeviceC-GigabitEthernet1/0/5] port access vlan 20
[DeviceC-GigabitEthernet1/0/5] quit

```

Configuring Device D

```

# Assign GigabitEthernet 1/0/1, GigabitEthernet 1/0/2, and GigabitEthernet 1/0/3 to VLAN 10, VLAN
30, and VLAN 40, respectively.
<DeviceD> system-view
[DeviceD] vlan 10
[DeviceD-vlan10] quit
[DeviceD] interface gigabitethernet1/0/1
[DeviceD-GigabitEthernet1/0/1] port access vlan 10

```

```

[DeviceD-GigabitEthernet1/0/1] quit
[DeviceD] vlan 40
[DeviceD-vlan40] quit
[DeviceD] interface gigabitethernet1/0/3
[DeviceD-GigabitEthernet1/0/3] port access vlan 40
[DeviceD] vlan 30
[DeviceD-vlan30] quit
[DeviceD] interface gigabitethernet1/0/2
[DeviceD-GigabitEthernet1/0/2] port access vlan 30

# Enable IPv6 multicast routing, and enable IPv6 PIM-SM on VLAN-interface 10 and VLAN-interface 30.

[DeviceD] ipv6 multicast routing
[DeviceD-mrib6] quit
[DeviceD] interface vlan-interface 10
[DeviceD-Vlan-interface10] ipv6 pim sm
[DeviceD-Vlan-interface10] quit
[DeviceD] vlan 30
[DeviceD-vlan30] quit
[DeviceD] interface vlan-interface 30
[DeviceD-Vlan-interface30] ipv6 pim sm
[DeviceD-Vlan-interface30] quit

# Enable MLDv2 on VLAN-interface 40.

[DeviceD] interface vlan-interface 40
[DeviceD-Vlan-interface40] mld enable
[DeviceD-Vlan-interface40] mld version 2
[DeviceD-Vlan-interface40] quit

```

Verifying the configuration

Verify that Device B sends and receives keepalive packets correctly.

```

<DeviceB> display drni keepalive
Neighbor keepalive link status (cause): Up
Neighbor is alive for: 2128 s 421 ms
Keepalive packet transmission status:
  Sent: Successful
  Received: Successful
Last received keepalive packet information:
  Source IP address: 2002::1
  Time: 2021/12/21 15:45:15
  Action: Accept

Distributed relay keepalive parameters:
Destination IP address: 2002::1
Source IP address: 2002::2
Keepalive UDP port : 6400
Keepalive VPN name : N/A
Keepalive interval : 1000 ms
Keepalive timeout : 5 sec

```

Keepalive hold time: 3 sec

Verify that interfaces used by DRNI operate correctly on Device B.

<DeviceB> display drni summary

Flags: A -- Aggregate interface down, B -- No peer DR interface configured
C -- Configuration consistency check failed

IPP: BAGG1

IPP state (cause): UP

Keepalive link state (cause): UP

DR interface information

DR interface	DR group	Local state (cause)	Peer state	Remaining down time(s)
BAGG2	1	UP	UP	-

Verify that the DR interface on Device B operates correctly.

<DeviceB> display link-aggregation verbose bridge-aggregation 2

Loadsharing Type: Shar -- Loadsharing, NonS -- Non-Loadsharing
Port Status: S -- Selected, U -- Unselected, I -- Individual
Port: A -- Auto port, M -- Management port, R -- Reference port
Flags: A -- LACP_Activity, B -- LACP_Timeout, C -- Aggregation,
D -- Synchronization, E -- Collecting, F -- Distributing,
G -- Defaulted, H -- Expired

Aggregate Interface: Bridge-Aggregation2

Creation Mode: Manual

Aggregation Mode: Dynamic

Loadsharing Type: Shar

Management VLANs: None

System ID: 0x7b, 0001-0001-0001

Local:

Port	Status	Priority	Index	Oper-Key	Flag
GE1/0/5(R)	S	32768	32770	40001	{ACDEF}
GE1/0/6	S	32768	32770	40001	{ACDEF}

Remote:

Actor	Priority	Index	Oper-Key	SystemID	Flag
GE1/0/5	32768	2	1	0x8000, 84c4-42e5-0300	{ACDEF}
GE1/0/6	32768	2	1	0x8000, 84c4-42e5-0300	{ACDEF}

Verify that the MLD group information on Device D is correct.

<DeviceD> display mld group

MLD groups in total: 1

Vlan-interface40(FE80::200:FCFF:FE00:3472):

MLD groups reported in total: 1

Group address: FF08::2

Last reporter: FE80::1

Uptime: 01:56:46

Expires: 00:02:43

Verify that IPv6 PIM routing entries have been created on Device B.

```

<DeviceB> display ipv6 pim routing-table
Total 1 (*, G) entries; 1 (S, G) entries
(*, FF08::2)
  RP: 2222::2222(local)
  Protocol: pim-sm, Flag: WC
  UpTime: 00:17:51
  Upstream interface: Register-Tunnel0
    Upstream neighbor: NULL
    RPF prime neighbor: NULL
  Downstream interface information:
  Total number of downstream interfaces: 1
    1: Vlan-interface30
      Protocol: pim-sm, UpTime: 00:17:51, Expires: 00:02:39
(2000::111, FF08::2)
  RP: 2222::2222(local)
  Protocol: pim-sm, Flag: SPT LOC ACT 2MVPN
  UpTime: 00:17:54
  Upstream interface: Vlan-interface20
    Upstream neighbor: NULL
    RPF prime neighbor: NULL
  Downstream interface information:
  Total number of downstream interfaces: 1
    1: Vlan-interface30
      Protocol: pim-sm, UpTime: 00:17:54, Expires: 00:02:36
# Verify that IPv6 multicast forwarding entries have been created on Device B.
<DeviceB> display ipv6 multicast forwarding-table
Total 1 entries, 1 matched

00001. (2000::111, FF08::2)
  Flags: 0x0
  Uptime: 00:08:27, Timeout in: 00:03:27
  Incoming interface: Vlan-interface20
  List of 1 outgoing interfaces:
    1: Vlan-interface30
  Matched 5 packets(71681 bytes), Wrong If 0 packets
  Forwarded 5 packets(71681 bytes)

# Verify that Device A does not create IPv6 PIM routing entries or multicast forwarding entries, which
indicates that Device B forwards all multicast traffic to the receiver. (Details not shown.)

```

Configuration files

- Device A:


```

#
sysname DeviceA
#
ospfv3 1
router-id 2.2.2.2
area 0.0.0.0

```

```

#
vlan 10
#
vlan 20
#
interface Bridge-Aggregation1
    port link-type trunk
    port trunk permit vlan all
    link-aggregation mode dynamic
    port drni intra-portal-port 1
#
interface Bridge-Aggregation2
    port link-type trunk
    port trunk permit vlan 1 20
    link-aggregation mode dynamic
    port drni group 1
#
interface LoopBack0
    ospfv3 1 area 0.0.0.0
    ipv6 pim sm
    ipv6 address 1111::1111/128
#
interface Vlan-interface10
    ospfv3 1 area 0.0.0.0
    ipv6 pim sm
    ipv6 address 2003::1/80
#
interface Vlan-interface20
    ospfv3 1 area 0.0.0.0
    ipv6 pim sm
    ipv6 address 2000::1/80
    vrrp ipv6 vrid 1 virtual-ip FE80::10 link-local
    vrrp ipv6 vrid 1 virtual-ip 2000::10
    vrrp ipv6 vrid 1 priority 200
#
interface GigabitEthernet1/0/3
    ipv6 address 2002::1/80
#
interface GigabitEthernet1/0/5
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 2
#
interface GigabitEthernet1/0/6
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 2
#

```

```

interface GigabitEthernet1/0/4
    port access vlan 10
#
interface GigabitEthernet1/0/1
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 1
#
interface GigabitEthernet1/0/2
    port link-type trunk
    port trunk permit vlan 1 20
    port link-aggregation group 1
#
ipv6 multicast routing
#
ipv6 pim
    c-bsr 1111::1111
    c-rp 1111::1111
#
    drni system-mac 0001-0001-0001
    drni system-number 1
    drni system-priority 123
    drni keepalive ipv6 destination 2002::2 source 2002::1
    drni mad exclude interface GigabitEthernet1/0/3
#

```

- **Device B:**

```

#
    sysname DeviceB
#
ospfv3 1
    router-id 3.3.3.3
    area 0.0.0.0
#
vlan 20
#
vlan 30
#
interface Bridge-Aggregation1
    port link-type trunk
    port trunk permit vlan all
    link-aggregation mode dynamic
    port drni intra-portal-port 1
#
interface Bridge-Aggregation2
    port link-type trunk
    port trunk permit vlan 1 20
    link-aggregation mode dynamic
    port drni group 1

```



```

#
interface LoopBack0
  ospfv3 1 area 0.0.0.0
  ipv6 pim sm
  ipv6 address 2222::2222/128
#
interface Vlan-interface20
  ospfv3 1 area 0.0.0.0
  ipv6 pim sm
  ipv6 address 2000::2/80
  vrrp ipv6 vrid 1 virtual-ip FE80::10 link-local
  vrrp ipv6 vrid 1 virtual-ip 2000::10
  vrrp ipv6 vrid 1 priority 100

#
interface Vlan-interface30
  ospfv3 1 area 0.0.0.0
  ipv6 pim sm
  ipv6 address 2004::1/80
#
interface GigabitEthernet1/0/3
  ospfv3 1 area 0.0.0.0
  ipv6 address 2002::2/80
#
interface GigabitEthernet1/0/5
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 2
#
interface GigabitEthernet1/0/6
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 2
#
interface GigabitEthernet1/0/4
  port access vlan 30
#
interface GigabitEthernet1/0/1
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 1
#
interface GigabitEthernet1/0/2
  port link-type trunk
  port trunk permit vlan 1 20
  port link-aggregation group 1
#
ipv6 multicast routing

```

```
#
ipv6 pim
c-bsr 2222::2222
c-rp 2222::2222
#
drni system-mac 0001-0001-0001
drni system-number 2
drni system-priority 123
drni keepalive ipv6 destination 2002::1 source 2002::2
drni mad exclude interface GigabitEthernet1/0/3
```

- **Device C:**

```
#
sysname DeviceC
#
vlan 20
#
interface Bridge-Aggregation1
port link-type trunk
port trunk permit vlan 1 20
link-aggregation mode dynamic
#
interface LoopBack1
ipv6 address FE80::2 link-local
#
interface GigabitEthernet1/0/5
port access vlan 20
#
interface GigabitEthernet1/0/1
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1
#
interface GigabitEthernet1/0/2
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1
#
interface GigabitEthernet1/0/3
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1
#
interface GigabitEthernet1/0/4
port link-type trunk
port trunk permit vlan 1 20
port link-aggregation group 1
#
```

- **Device D:**

```
#
 sysname DeviceD
#
ospfv3 1
 router-id 4.4.4.4
 area 0.0.0.0
#
vlan 10
#
vlan 40
#
vlan 30
#
interface Vlan-interface10
 ospfv3 1 area 0.0.0.0
 ipv6 pim sm
 ipv6 address 2003::2/80
#
interface Vlan-interface40
 ospfv3 1 area 0.0.0.0
 ipv6 address 20::1/80
 mld enable
 mld version 2
#
interface Vlan-interface30
 ospfv3 1 area 0.0.0.0
 ipv6 pim sm
 ipv6 address 2004::2/80
#
interface GigabitEthernet1/0/3
 port access vlan 40
#
interface GigabitEthernet1/0/1
 port access vlan 10
#
interface GigabitEthernet1/0/2
 port access vlan 30
#
ipv6 multicast routing
#
pim
#
```