**Interconnecting a Company and Its Branches Using IPv6 Static Routes**

Student Version



Huawei Technologies Co., Ltd.

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# Interconnecting a Company and Its Branches Using IPv6 Static Route

## Background

The company Jan16 has three offices: Beijing headquarters, Guangzhou branch, and Shanghai branch. The two branches are connected to the headquarters through routers. Routers R1, R2, and R3 reside in Beijing headquarters, Shanghai branch, and Guangzhou branch respectively, and IPv6 is enabled on the entire network. Static routes need to be configured so that all PCs in the company can communicate with each other. Figure 1-1 shows the network topology. The specific requirements are as follows:

Routers are connected through VPNs.

The headquarters and branches are connected using static routes.

The IP addresses and interfaces of PCs and routers are shown in the following topology section.

## Objectives

Upon completion of this task, you will be able to:

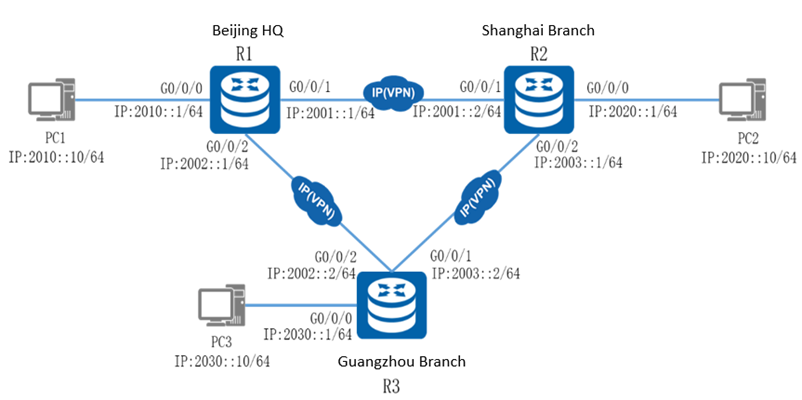
Learn how to manually configure IPv6 address on the routers.

Learn how to configure IPv6 static routes.

Learn how to configure IPv6 address on the PCs.

## Topology

Network topology



Beijing headquarters, Shanghai branch, and Guangzhou branch use network segments 2010::0/64, 2020::0/64, and 2030::0/64 respectively. The network segments between R1 and R2, between R1 and R3, and between R2 and R3 are 2001::0/64, 2002::0/64, and 2003::0/64 respectively. Static routes need to be configured on the routers so that all PCs can communicate with each other.

The IP address planning and interface planning can be referred in the appendix.

## Implementation

### Roadmap

1. Configure interfaces on the routers.
2. Configure static routes.
3. Configure an IP address for each PC.

### Procedure

Configure link aggregation manually.

Enable IPv6 in the system view on the routers. Run the ipv6 enable command to enable IPv6 on GigabitEthernet 0/0/0 of R1.

# Configure R1.

#Configure R2.

#Configure R3.

Configure static routes.

On R1, configure a static route with the network segment where PC2 resides as the destination network segment. That is, configure a static route with the destination IP address 2020:: and 64-bit mask. If R1 wants to send data to PC2, R1 first needs to send the data to its next-hop router R2. Therefore, the next-hop IP address of the configured static route is the IP address of the physical interface on the direct link between R2 and R1, namely, 2001::2.

#Configure a static route with the network segment where PC3 resides as the destination network segment.

#Similarly, on R2, configure two static routes with the network segments where PC1 and PC3 respectively reside as the destination network segments.

#Similarly, on R3, configure two static routes with the network segments where PC1 and PC2 respectively reside as the destination network segments.

Configure IP addresses for PCs.

Configure the IP addresses of PCs referred by the appendix.

* 1. **Verification**

Check the interface configuration.

Run the **display ipv6 interface brief** command on the routers to check the configuration.

#R1 configuration

[R1]display ipv6 interface brief

\*down: administratively down

(l): loopback

(s): spoofing

Interface Physical Protocol

GigabitEthernet0/0/0 up up

[IPv6 Address] 2010::1

GigabitEthernet0/0/1 up up

[IPv6 Address] 2001::1

GigabitEthernet0/0/2 up up

[IPv6 Address] 2002::1

#R2 configuration

[R2]display ipv6 interface brief

\*down: administratively down

(l): loopback

(s): spoofing

Interface Physical Protocol

GigabitEthernet0/0/0 up up

[IPv6 Address] 2020::1

GigabitEthernet0/0/1 up up

[IPv6 Address] 2001::2

GigabitEthernet0/0/2 up up

[IPv6 Address] 2003::1

#R3 configuration

[R3]display ipv6 interface brief

\*down: administratively down

(l): loopback

(s): spoofing

Interface Physical Protocol

GigabitEthernet0/0/0 up up

[IPv6 Address] 2030::1

GigabitEthernet0/0/1 up up

[IPv6 Address] 2003::2

GigabitEthernet0/0/2 up up

[IPv6 Address] 2002::2

Test the interoperability of PCs.

Run the ping command to test the internal communication of each PC.

#Ping PC2 from PC1.

[C:\~]$ping 2020::10

Ping 2020::10: 32 data bytes, Press Ctrl\_C to break

From 2020::10: bytes=32 seq=1 hop limit=253 time=16 ms

From 2020::10: bytes=32 seq=2 hop limit=253 time=16 ms

From 2020::10: bytes=32 seq=3 hop limit=253 time=31 ms

From 2020::10: bytes=32 seq=4 hop limit=253 time=16 ms

From 2020::10: bytes=32 seq=5 hop limit=253 time=15 ms

--- 2020::10 ping statistics ---

5 packet(s) transmitted

5 packet(s) received

0.00% packet loss

round-trip min/avg/max = 15/18/31 ms

#Ping PC3 from PC1.

[C:\~]$ping 2030::10

Ping 2030::10: 32 data bytes, Press Ctrl\_C to break

From 2030::10: bytes=32 seq=1 hop limit=253 time=15 ms

From 2030::10: bytes=32 seq=2 hop limit=253 time=16 ms

From 2030::10: bytes=32 seq=3 hop limit=253 time=31 ms

From 2030::10: bytes=32 seq=4 hop limit=253 time=16 ms

From 2030::10: bytes=32 seq=5 hop limit=253 time=31 ms

--- 2030::10 ping statistics ---

5 packet(s) transmitted

5 packet(s) received

0.00% packet loss

round-trip min/avg/max = 15/21/31 ms

The command output shows that the PCs can communicate with each other.

----**End**

* 1. **Appendix**

IP address planning

| Device | Interface | IP Address |
| --- | --- | --- |
| R1 | G0/0/0 | 2010::1/64 |
| R1 | G0/0/1 | 2001::1/64 |
| R1 | G0/0/2 | 2002::1/64 |
| R2 | G0/0/0 | 2020::1/64 |
| R2 | G0/0/1 | 2001::2/64 |
| R2 | G0/0/2 | 2003::1/64 |
| R3 | G0/0/0 | 2030::1/64 |
| R3 | G0/0/1 | 2003::2/64 |
| R3 | G0/0/2 | 2002::2/64 |
| PC1 | E0/0/1 | 2010::10/64 |
| PC2 | E0/0/1 | 2020::10/64 |
| PC3 | E0/0/1 | 2030::10/64 |

Interface planning

| Local Device | Local Interface | Peer Device | Peer Interface |
| --- | --- | --- | --- |
| R1 | G0/0/0 | PC1 | Eth0/0/1 |
| R1 | G0/0/1 | R2 | G0/0/1 |
| R1 | G0/0/2 | R3 | G0/0/2 |
| R2 | G0/0/0 | PC2 | Eth0/0/1 |
| R2 | G0/0/1 | R1 | G0/0/1 |
| R2 | G0/0/2 | R3 | G0/0/1 |
| R3 | G0/0/0 | PC3 | Eth0/0/1 |
| R3 | G0/0/1 | R2 | G0/0/2 |
| R3 | G0/0/2 | R1 | G0/0/2 |
| PC1 | Eth0/0/1 | R1 | G0/0/0 |
| PC2 | Eth0/0/1 | R2 | G0/0/0 |
| PC3 | Eth0/0/1 | R3 | G0/0/0 |

Route planning

| Router | Destination Network Segment | Next-Hop Address/Interface |
| --- | --- | --- |
| R1 | 2020::/64 | 2001::2 |
| R1 | 2030::/64 | 2002::2 |
| R2 | 2010::/64 | 2001::1 |
| R2 | 2030::/64 | 2003::2 |
| R3 | 2010::/64 | 2002::1 |
| R3 | 2020::/64 | 2003::1 |

----End