IPv6_route

Static
Dynamic: RIPng, EIGRPv6/64bit-EIGRP, OSPFv3, IS-IS, BGP

Static route example

R1

Router>en

Router#conf t

Router(config)#interface ethernet 0/0

Router(config-if)#ipv6 address 2001:0:0:12::1/64

Router(config-if)#no shutdown

Router(config-if)#end

Router#conf t

Router(config)#hostname R1

R1(config)#interface ethernet 0/1

R1(config-if)#ipv6 address 2001:0:0:13::1/64

R1(config-if)#no shutdown

R1(config-if)#exit

R1(config)#interface loopback 0

R1(config-if)#ipv6 address 1::1/128

R1(config-if)#end

R1#show ipv6 interface brief

R1#show ipv6 route

R2

R2(config)#interface ethernet 0/1

R2(config-if)#no shutdown

R2(config-if)#ipv6 address 2001:0:0:12::2/64

R2(config-if)#exit

R2(config)#interface loopback 0

R2(config-if)#ipv6 address 2::2/128

R2(config-if)#end

R2#show ipv6 interface brief

R2#show ipv6 route

R1

R1(config)#ipv6 unicast-routing

R1(config)#ipv6 route 2::2/128 ethernet 0/0 2001:0:0:12::2

R1(config)#end

R1#show ipv6 route

R2

R2(config)#ipv6 unicast-routing

R2(config)#ipv6 route 1::1/128 ethernet 0/1 **FE80::A8BB:CCFF:FE00:100**

R2(config)#end

R2#show ipv6 route

Can use link-local address as the next hop address

Result

```
R1#show ipv6 route
IPv6 Routing Table - default - 7 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       RL - RPL, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
LC  1::1/128 [0/0]
     via Loopback0, receive
S   2::2/128 [1/0]
     via 2001:0:0:12::2, Ethernet0/0
C   2001:0:0:12::/64 [0/0]
     via Ethernet0/0, directly connected
L   2001:0:0:12::1/128 [0/0]
     via Ethernet0/0, receive
C   2001:0:0:13::/64 [0/0]
     via Ethernet0/1, directly connected
L   2001:0:0:13::1/128 [0/0]
     via Ethernet0/1, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

```
R2#ping 1::1 source 2::2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1::1, timeout is 2 seconds:
Packet sent with a source address of 2::2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

Cancel static connection

```
R1#show run | section ipv6
ipv6 unicast-routing
ipv6 cef
 ipv6 address 1::1/128
 ipv6 address 2001:0:0:12::1/64
 ipv6 address 2001:0:0:13::1/64
ipv6 route 2::2/128 Ethernet0/0 2001:0:0:12::2
ipv6 ioam timestamp
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#no ipv6 route 2::2/128 Ethernet0/0 2001:0:0:12::2
```

```
R2#show run | se
R2#show run | section ipv6
ipv6 unicast-routing
ipv6 cef
 ipv6 address 2::2/128
 ipv6 address 2001:0:0:12::2/64
ipv6 route 1::1/128 Ethernet0/1 FE80::A8BB:CCFF:FE00:100
ipv6 ioam timestamp
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#no ipv6 route 1::1/128 Ethernet0/1 FE80::A8BB:CCFF:FE00:100
```

RIPng

Continue to the static part

R1

R1(config)#ipv6 router rip QiuwenR1

R1(config-rtr)#exit

R1(config)#interface range ethernet 0/0 - 1 , loopback 0

R1(config-if-range)#ipv6 rip QiuwenR1 enable

R1(config-if-range)#end

R1#show ipv6 route rip

R2

R2(config)#ipv6 router rip Qiuwen

R2(config-rtr)#exit

R2(config)#interface range ethernet 0/1 , loopback 0

R2(config-if-range)#ipv6 rip Qiuwen enable

R2(config-if-range)#end

R2#show ipv6 route rip

R3

R3#conf t

R3(config)#ipv6 router rip QiuwenR3

R3(config-rtr)#exit

R3(config)#interface range ethernet 0/0 , loopback 0

R3(config-if-range)#ipv6 rip QiuwenR3 enable

R3(config-if-range)#end

```
R2#show ipv6 route rip
IPv6 Routing Table - default - 7 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       RL - RPL, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
R   1::1/128 [120/2]
     via FE80::A8BB:CCFF:FE00:100, Ethernet0/1
R   3::3/128 [120/3]
     via FE80::A8BB:CCFF:FE00:100, Ethernet0/1
R   2001:0:0:13::/64 [120/2]
     via FE80::A8BB:CCFF:FE00:100, Ethernet0/1
```

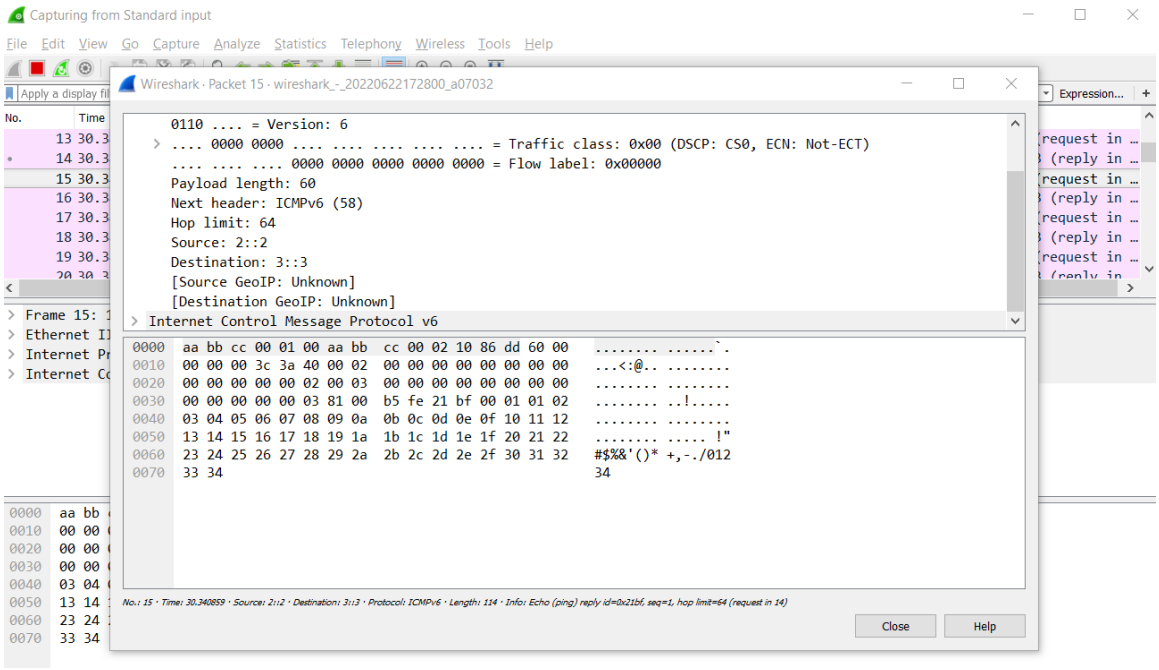
link-local

Result

```
R3#ping 2::2 source 3::3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2::2, timeout is 2 seconds:
Packet sent with a source address of 3::3
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

Capture

Capture the data from any port



Summery

But rip here only can route for IPv6, can not do route for both IPv4 and IPv6

So here trying to use EIGRPv6/64bit-EIGRP

EIGRPv6/64bit-EIGRP

Old version in R2&3 only support ipv6, the new method shown in R1 support both ipv4 and ipv6

R2 (traditional EIGRPv6)

R2>en

R2#conf t

R2(config)#no ipv6 router rip Qiuwen

R2(config)#ipv6 router eigrp 90

R2(config-rtr)#eigrp router-id 2.2.2.2

R2(config-rtr)#no shutdown

R2(config-rtr)#exit

R2(config)#interface range loopback 0 , ethernet 0/1

R2(config-if-range)#ipv6 eigrp 90

R1(new method, support both ipv4 and ipv6)

R1(config)#no ipv6 router rip QiuwenR1

R1(config)#router eigrp Qiuwen

R1(config-router)#address-family ipv6 unicast autonomous-system 90

R1(config-router-af)#eigrp router-id 1.1.1.1

R1(config-router-af)#

*Jun 23 00:27:25.066: %DUAL-5-NBRCHANGE: EIGRP-IPv6 90: Neighbor FE80::A8BB:CCFF:FE00:210 (Ethernet0/0) is up: new adjacency

Don't need to claim, this command will let all ports claim automatically.

R3 (traditional way)

R3(config)#ipv6 router eigrp 90

R3(config-rtr)#eigrp router-id 3.3.3.3

R3(config-rtr)#no shutdown

R3(config-rtr)#exit

R3(config)#interface range loopback 0 , ethernet 0/0

R3(config-if-range)#ipv6 eigrp 90

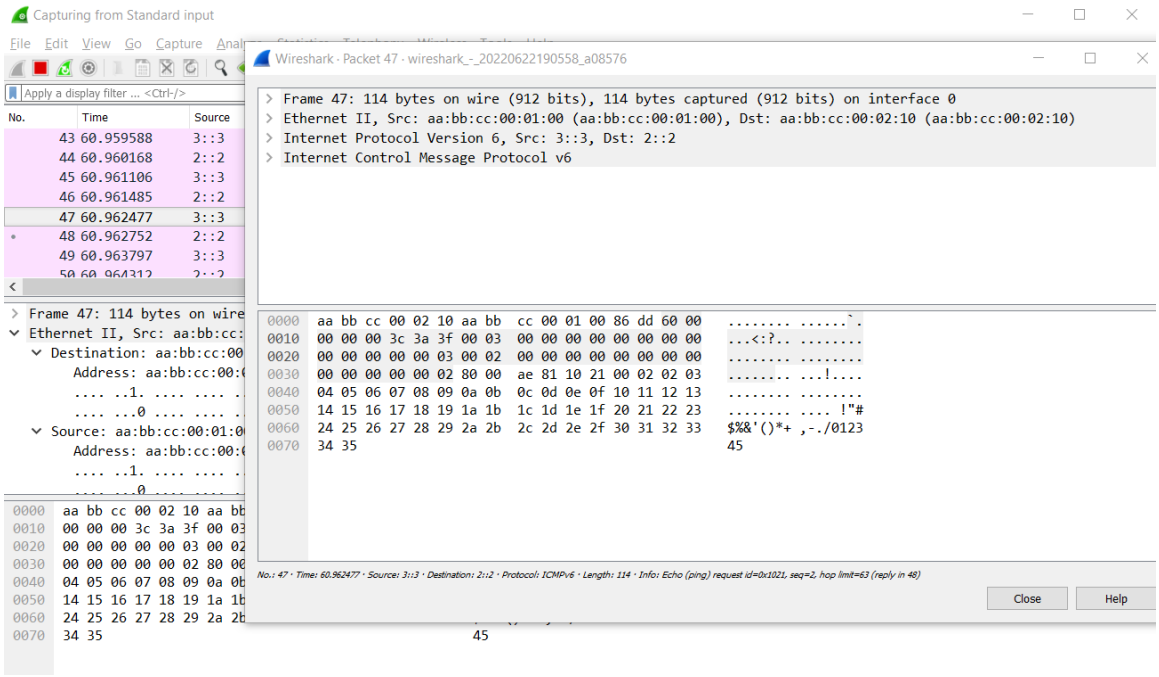
R3(config-if-range)#

*Jun 23 00:57:14.030: %DUAL-5-NBRCHANGE: EIGRP-IPv6 90: Neighbor FE80::A8BB:CCFF:FE00:110 (Ethernet0/0) is up: new adjacency

Result

```
R1#show ipv6 eigrp neighbors
EIGRP-IPv6 VR(Qiuwen) Address-Family Neighbors for AS(90)
H   Address                 Interface              Hold Uptime   SRTT   RTO  Q  Seq
                                                   (sec)         (ms)       Cnt Num
1   Link-local address:     Et0/1                    13 00:01:41    9   100  0  3
    FE80::A8BB:CCFF:FE00:300
0   Link-local address:     Et0/0                    13 00:31:30    6   100  0  4
    FE80::A8BB:CCFF:FE00:210
R1#show ipv
R1#show ipv6 rou
R1#show ipv6 route ei
R1#show ipv6 route eigrp
IPv6 Routing Table - default - 8 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       RL - RPL, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
D   2::2/128 [90/3584000]
     via FE80::A8BB:CCFF:FE00:210, Ethernet0/0
D   3::3/128 [90/3584000]
     via FE80::A8BB:CCFF:FE00:300, Ethernet0/1
```

```
R3#ping 2::2 source 3::3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2::2, timeout is 2 seconds:
Packet sent with a source address of 3::3
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```



OSFPv3

Same with EIGRPv6/64bit-EIGRP, old version only can be used in ipv6, but the new method can be used in both ipv4 and ipv6

R1(config)#no router eigrp Qiuwen

R2(config)#no ipv6 router eigrp 90

R3(config)#no ipv6 router eigrp 90

R2

R2(config)#ipv6 router ospf 110

R2(config-rtr)#router-id 2.2.2.2

R2(config-rtr)#area 0

% Incomplete command.

R2(config-rtr)#exit

R2(config)#interface range ethernet 0/1 , loopback 0

R2(config-if-range)#ipv6 ospf 110 area 0

R1

R1(config)#router ospfv3 110

R1(config-router)#router-id 1.1.1.1

R1(config-router)#address-family ipv6 unicast

R1(config-router-af)#exit

R1(config-router)#exit

R1(config)#interface range ethernet 0/0 - 1 , loopback 0

R1(config-if-range)#ospfv3 110 ipv6 area 0

R3

R3(config)#ipv6 router ospf 110

R3(config-rtr)#router-id 3.3.3.3

R3(config-rtr)#exit

R3(config)#interface range loopback 0 , ethernet 0/0

R3(config-if-range)#ipv6 ospf 110 area 0

Show neighbor

```
R2#show ipv6 ospf neighbor

            OSPFv3 Router with ID (2.2.2.2) (Process ID 110)

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
1.1.1.1           1   FULL/BDR        00:00:36    3               Ethernet0/1
```

```
R3#show ipv6 ospf neighbor

            OSPFv3 Router with ID (3.3.3.3) (Process ID 110)

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
1.1.1.1           1   FULL/DR         00:00:34    4               Ethernet0/0
```

```
R1#show ospfv3 ipv6 neighbor

          OSPFv3 110 address-family ipv6 (router-id 1.1.1.1)

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
3.3.3.3           1   FULL/BDR        00:00:31    3               Ethernet0/1
2.2.2.2           1   FULL/DR         00:00:32    4               Ethernet0/0
```

The commands are different

R1#show ospfv3 ipv6 neighbor

R2#show ipv6 ospf neighbor

Route

```
R2#show ipv6 route ospf
IPv6 Routing Table - default - 7 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       RL - RPL, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
O   1::1/128 [110/10]
     via FE80::A8BB:CCFF:FE00:100, Ethernet0/1
O   3::3/128 [110/20]
     via FE80::A8BB:CCFF:FE00:100, Ethernet0/1
O   2001:0:0:13::/64 [110/20]
     via FE80::A8BB:CCFF:FE00:100, Ethernet0/1
```

```
R1#show ipv6 route ospf
IPv6 Routing Table - default - 8 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       RL - RPL, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
O   2::2/128 [110/10]
     via FE80::A8BB:CCFF:FE00:210, Ethernet0/0
O   3::3/128 [110/10]
     via FE80::A8BB:CCFF:FE00:300, Ethernet0/1
```

Result

```
R2#ping 3::3 source 2::2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 3::3, timeout is 2 seconds:
Packet sent with a source address of 2::2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

```
R3#ping 2::2 source 3::3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2::2, timeout is 2 seconds:
Packet sent with a source address of 3::3
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```