

# IPv6 router configuration



# Overview

- Basic connectivity configuration for IPv6
- Configuration for IPv6 tunnel
- Configuration of static route
- Configuration of OSPF
- Configuration of BGP



# Basic connectivity configuration

- How to implement
  - Configure IPv6 and enable IPv6 routing
  - Configure the prefixes
    - Manually
    - Based on a 6to4 interface
    - Dynamic prefix delegation
    - Interface dual stacks support



# Basic connectivity configuration

- Manually
  - Defines the prefixes for an IPv6 address
    - Need to specify both IPv6 prefix and prefix length

```
ipv6 general-prefix prefix-name {ipv6-prefix/prefix-length | 6to4 interface-type interface-number}
```

Example:

```
Router(config)# ipv6 general-prefix my-prefix  
2001:0DB8:2222::/48
```



# Basic connectivity configuration

- Based on a 6to4 interface
  - Specify the 6to4 keyword and the interface type / interface number
    - When defining the 6to4 prefix  
2001:a.b.c.d::/48 (a.b.c.d is the IPv4 address of the interface referenced)

```
ipv6 general-prefix prefix-name {ipv6-prefix/prefix-length  
| 6to4 interface-type interface-number}
```

Example:

```
Router(config)# ipv6 general-prefix my-prefix 6to4  
ethernet 0
```



# Basic connectivity configuration

- Dynamic prefix delegation
  - Specify the interface type and number
  - Configure IPv6 prefix name for an IPv6 address then enable to process on the interface

```
ipv6 address {ipv6-address/prefix-length | prefix-name  
sub-bits/prefix-length}
```

Example:

```
Router(config-if) ipv6 address my-prefix  
2001:0DB8:0:7272::/64
```



# Basic connectivity configuration

- Interface dual stacks support
  - Enable unicast datagram forwarding
  - Specify the interface type and number
  - Define the IPv4 address of the interface
  - Define the IPv6 address of the interface and enable IPv6 process on the interface

```
ipv6 unicast-routing
```

Example:

```
Router(config)# ipv6 unicast routing
```

```
ip address ip-address mask
```

Example:

```
Router(config-if)# ip address 192.168.99.1 255.255.255.0
```

```
ipv6 address ipv6-prefix/prefix-length [eui-64]
```

Example:

```
Router(config-if)# ipv6 address 2001:0DB8:c18:1::3/64
```



# Configuration for IPv6 tunnel

- Tunnel configuration
  - Manually
  - 6to4



# Configuration for IPv6 tunnel

- Manually
  - Specify the IPv6 network assigned for the interface and enable the process
  - Specify the IPv4 sources address or the interface
  - Specify the IPv4 destination address or the host for the tunnel interface
  - Create a manual IPv6 tunnel



# Configuration for IPv6 tunnel

```
interface tunnel tunnel-number
```

Example:

```
Router(config)# interface tunnel 0
```

```
ipv6 address ipv6-prefix/prefix-length [eui-64]
```

Example:

```
Router(config-if)# ipv6 address 3ffe:b00:c18:1::3/64
```

```
tunnel source {ip-address | interface-type interface-number}
```

Example:

```
Router(config-if)# tunnel source ethernet 0
```

```
tunnel destination ip-address
```

Example:

```
Router(config-if)# tunnel destination 192.168.30.1
```

```
tunnel mode ipv6ip
```

Example:

```
Router(config-if)# tunnel mode ipv6ip
```



# Configuration for IPv6 tunnel

- 6to4
  - Specify a tunnel interface and number
  - Specify the IPv6 address assigned to the interface and enable process on the interface
  - Specify the source interface type and number for the tunnel interface
  - Specify the IPv6 overlay tunnel using 6to4 address
  - Configure a static route for the IPv6 6to4 prefix 2002::/16 to the specified tunnel interface



# Configuration for IPv6 tunnel

```
interface tunnel tunnel-number
```

Example:

```
Router(config)# interface tunnel 0
```

```
ipv6 address ipv6-prefix/prefix-length [eui-64]
```

Example:

```
Router(config-if)# ipv6 address 2002:c0a8:6301:1::1/64
```

```
tunnel source {ip-address | interface-type interface-number}
```

Example:

```
Router(config-if)# tunnel source ethernet 0
```

```
tunnel mode ipv6ip 6to4
```

Example:

```
Router(config-if)# tunnel mode ipv6ip 6to4
```

```
ipv6 route ipv6-prefix/prefix-length tunnel tunnel-number
```

Example:

```
Router(config)# ipv6 route 2002::/16 tunnel 0
```



# Configuration of static route

- Static configuration

```
ipv6 route ipv6-prefix/prefix-length {ipv6-address  
| interface-type interface-number [ipv6-address]}  
[administrative-distance] [administrative-  
multicast-distance | unicast | multicast] [tag  
tag]
```

**Example:**

```
Router(config)# ipv6 route ::/0 serial 2/0
```

```
Router(config)# ipv6 route 2001:0DB8::/32 serial 0
```

```
Router(config)# ipv6 route 2001:0DB8::/32  
2001:0DB8:2002:1
```



# Configuration of OSPF

- Required to enable OSPF for IPV6 on an interface
- Specify the interface type and number
- Enable OSPF router configuration mode
- Define the area range

```
interface type number
```

Example:

```
Router(config)# interface ethernet 0/0
```

```
ipv6 ospf process-id area area-id [instance instance-id]
```

Example:

```
Router(config-if)# ipv6 ospf 1 area 0
```



# Configuration of OSPF

```
ipv6 router ospf process-id
```

Example:

```
Router(config)# ipv6 router ospf 1
```

```
area area-id range ipv6-prefix/prefix-length [advertise |  
not-advertise] [cost cost]
```

Example:

```
Router(config-rtr)# area range 1 2001:0DB8::/48
```



# Configuration of BGP

- Required configuration
  - BGP routing process and router ID
  - Multiprotocol BGP peer
  - Advertised routes
- Optional configuration
  - Peering with the use of link-local address
  - Peer Group configuration
  - Redistribution of prefixes
  - Advertising IPv4 between IPv6 peers



# Configuration of BGP

- Configuring BGP routing process
  - Configure BGP routing process
  - Disable IPv4 unicast address family

```
router bgp as-number
```

Example:

```
Router(config)# router bgp 65000
```

```
no bgp default ipv4-unicast
```

Example:

```
Router(config-router)# no bgp default ipv4-unicast
```



# Configuration of BGP

- Multiprotocol peering
  - Configure the neighbor

```
neighbor {ip-address | ipv6-address | peer-group-name} remote-as as-number
```

Example:

```
Router(config-router)# neighbor 2001:0DB8:0:CC00::1 remote-as 64600
```



# Configuration of BGP

- Advertised routes
  - Configure the network statement

```
address-family ipv6 [unicast | multicast]
```

Example:

```
Router(config-router)# address-family ipv6 unicast
```

```
network {network-number [mask network-mask] | nsap-prefix} [route-  
map map-tag]
```

Example:

```
Router(config-router-af)# network 2001:0DB8::/32
```



# Network diagram



## R1

```
interface Tunnel0
no ip address
ipv6 address 3FF3:B00:C18:1::3/64
ipv6 enable
tunnel source FastEthernet0/1
tunnel destination 192.168.1.2
tunnel mode ipv6ip
!
interface FastEthernet0/0
ip address 192.168.0.1 255.255.255.0
duplex auto
speed auto
ipv6 address 2001:DB8:C18:1::3/64
ipv6 enable
!
interface FastEthernet0/1
ip address 192.168.1.1 255.255.255.252
duplex auto
speed auto
ipv6 enable
!
ipv6 route 2001:DB8:C19:1::/64 Tunnel0
```

## R2

```
interface Tunnel0
no ip address
ipv6 address 3FF3:B00:C18:1::1/64
ipv6 enable
tunnel source FastEthernet0/1
tunnel destination 192.168.1.1
tunnel mode ipv6ip
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
ipv6 address 2001:DB8:C19:1::3/64
ipv6 enable
no keepalive
!
interface FastEthernet0/1
ip address 192.168.1.2 255.255.255.252
duplex auto
speed auto
ipv6 enable
!
ip route 0.0.0.0 0.0.0.0 FastEthernet0/1
!
ipv6 route 2001:DB8:C18:1::/64 Tunnel0
```



# Questions?

