

# IPv6 Configuration

# Table of Contents

|   |   |
|---|---|
| Chapter 1 IPv6 Protocol's Configuration ..... | 1 |
| 1.1 IPv6 Protocol's Configuration .....       | 1 |
| 1.2 Enabling IPv6 .....                       | 1 |
| 1.2.1 Setting the IPv6 Address .....          | 1 |
| Chapter 2 Setting the IPv6 Services .....     | 3 |
| 2.1 Setting the IPv6 Services .....           | 3 |
| 2.1.1 Managing the IPv6 Link .....            | 3 |

# Chapter 1 IPv6 Protocol's Configuration

## 1.1 IPv6 Protocol's Configuration

The configuration of the IPv6 address of the router only takes effect on the VLAN interface, not on the physical interface.

The IPv6 protocol is disabled in default state. If the IPv6 protocol need be used on a VLAN interface, this protocol should be first enabled in VLAN interface configuration mode. To enable the IPv6 protocol, users have to set the IPv6 address. If on a VLAN interface at least one IPv6 address is set, the VLAN interface can handle the IPv6 packets and communicates with other IPv6 devices.

To enable the IPv6 protocol, users should finish the following task:

- Setting at least one IPv6 address in VLAN interface configuration mode

## 1.2 Enabling IPv6

### 1.2.1 Setting the IPv6 Address

The IPv6 address is used to determine the destination address to which the IPv6 packets can be sent. There are three kinds of IPv6 addresses.

| Kind              | Referred Format                  | Remarks  |
|-------------------|----------------------------------|--|
| Unicast address   | 2001:0:0:0:0DB8:800:200C:417A/64 | <b>2001:0:0:0:0DB8:800:200C:417A</b> stands for a unicast address, while <b>64</b> stands for the length of the prefix of this address.  |
| Multicast address | FF01:0:0:0:0:0:0:101             | All multicast addresses begin with FF.   |
| Any address       | 2002:0:0:0:0DB8:800:200C:417A/64 | The format of this address is the same as that of the unicast address. Different VLAN interfaces can be set to have the same address, no matter it is a unicast/broadcast/multicast address. |

For the further details of the IPv6 address, see RFC 4291.

In order to enable IPv6, users must set a unicast address in VLAN interface configuration mode. The set unicast address must be one or multiple addresses of the following type:

- IPv6 link-local address
- Global IPv6 address

To set an IPv6 link-local address in VLAN interface configuration mode, run the following commands.

| Command                         | Purpose                                  |
|---------------------------------|--|
| ipv6 enable                     | Sets a link-local address automatically. |
| ipv6 address fe80::x link-local | Sets a link-local address manually.      |

**Note:**

- The link-local address must begin with fe80. The default length of the prefix is 64 bit. At manual settings only the values at the last 64 bits can be designated.
- On a VLAN interface can only one link-local address be set.
- After IPv6 is enabled through the configuration of the link-local address, IPv6 only takes effect on the local link.

To set a global IPv6 address in VLAN interface configuration mode, run the following commands.

| Command   | Purpose   |
|---|---|
| ipv6 address autoconfig   | Sets a global address automatically.            |
| ipv6 address [ipv6-address/prefix-length   prefix-name sub-bits/prefix-length]   [eui-64] | Sets a global address.                          |
| ipv6 address X:X:X:X::X/<0-128> anycast   | Sets an address of unicast/broadcast/multicast. |

**Note:**

- When IPv6 is enabled through the configuration of a global address, all interconnected IPv6 device can be handled by IPv6.
- If a link-local address has not been set before the configuration of the global address, the system will set a link-local address automatically.

## Chapter 2 Setting the IPv6 Services

### 2.1 Setting the IPv6 Services

After IPv6 is enabled, all services provided by IPv6 can be set. The configurable IPv6 service is shown below:

- (1) Managing the IPv6 Link

#### 2.1.1 Managing the IPv6 Link

IPv6 provides a series of services to control and manage the IPv6 link. This series of services includes:

- (1) Setting the transmission frequency of the ICMPv6 packet
- (2) Setting the source IPv6 route
- (3) Setting the MTU of IPv6
- (4) Setting IPv6 redirection
- (5) Setting IPv6 destination unreachability
- (6) Setting IPv6 ACL
- (7) Setting IPv6 Hop-Limit

##### 1. Setting the transmission frequency of the ICMPv6 packet

If you want to limit the transmission frequency of the ICMPv6 packet, run the command in the following table. If the ICMPv6 transmission frequency is larger than the set value, the transmission frequency will be limited.

The default transmission frequency is 1000us. If you want to modify the transmission frequency, run the following command in global mode:

| Command  | Purpose   |
|--|---|
| <code>ipv6 icmp6-ratelimit <i>ratelimit</i></code> | Sets the transmission frequency of the ICMPv6 packet. |

##### 2. Setting the source IPv6 route

IPv6 allows a host to designate the route of an IPv6 network, that is, the source route. The host can realize the source route through using the routing header in the IPv6

packets. The router can forward packets according to the routing header, or desert this kind of packets considering security.

The router supports the source route by default. If the source route is closed, users can run the following command in global configuration mode to open the source route.

| Command           | Purpose                       |
|-------------------|-------------------------------|
| ipv6 source-route | Allows the source IPv6 route. |

### 3. Setting the MTU of IPv6

All interfaces have a default IPv6 MTU. If the length of an IPv6 packet exceeds MTU, the router will fragment this IPv6 packet.

To set IPv6 MTU on a specific interface, run the following command in interface configuration mode:

| Command               | Purpose                        |
|-----------------------|--------------------------------|
| ipv6 mtu <i>bytes</i> | Sets IPv6 MTU on an interface. |

### 4. Setting IPv6 redirection

Sometimes, the route selected by the host is not the best one. In this case, when a switch receives a packet from this route, the switch will transmit, according to the routing table, the packet from the interface where the packet is received, and forward it to another router which belongs to the same network segment with the host. Under this condition, the switch will notify the source host of sending the packets with the same destination address to another router directly, not by way of the switch itself. The redirection packet demands the source host to replace the original route with the more direct route contained in the redirection packet. The operating system of many hosts will add a host route to the routing table. However, the switch more trusts the information getting from the routing protocol and so the host route will not be added according to this information.

IPv6 redirection is opened by default. However, if a hot standby router protocol is configured on an interface, IPv6 redirection is automatically closed. If the hot standby router protocol is canceled, this function will not automatically opened.

To open IPv6 redirection, run the following command:

| Command        | Purpose  |
|----------------|--|
| ipv6 redirects | Allows IPv6 to transmit the redirection packets. |

### 5. Setting IPv6 destination unreachability

In many cases, the system will automatically transmit the destination-unreachable packets. Users can close this function. If this function is closed, the system will not transmit the ICMP unreachable packets.

To enable this function, run the following command:

| Command          | Purpose  |
|------------------|--|
| ipv6 unreachable | Allows IPv6 to transmit the destination unreachable packets. |

## 6. Setting IPv6 ACL

Users can use ACL to control the reception and transmission of packets on a VLAN interface. If you introduce ACL on a VLAN interface in global configuration mode and designate the filtration's direction, the IPv6 packets will be filtered on this VLAN interface.

To filter the IPv6 packets, run the following command in interface configuration mode.

| Command                                      | Purpose   |
|--|---|
| ipv6 traffic-filter <i>WORD</i> { in   out } | Filters the IPv6 packets in the reception or transmission direction (in: receive; out: transmit) on a VLAN interface. |

## 7. Setting IPv6 Hop-Limit

Users can designate a router to transmit the value of the hop-limit field in the packets (except those forwarded packets). All those packets that this router transmits out, if the upper-level application does not apparently designate a hop-limit value, use the set value of hop-limit. At the same time, the value of the hop-limit field is added to the RA packets that this router transmits.

The default hop-limit value is 64. If you want to change this value, you can run the following command in interface configuration mode.

| Command                        | Purpose   |
|--------------------------------|---|
| ipv6 cur-hoplimit <i>value</i> | Designates a router to transmit the hop-limit field of the packets. |