

IPv6 Default and Static Routing Cheat Sheet for Cisco Beginners

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This is a generic cheat sheet and not for a specific use case.

What is IPv6 Routing?

IPv6 routing works similar to IPv4 but uses 128-bit addresses. Static routes manually define paths to IPv6 networks, while default routes handle traffic to unknown destinations.

Enable IPv6 Routing

Enable IPv6 Forwarding

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

IPv6 Static Route Configuration

Basic IPv6 Static Route Syntax

```
Router(config)# ipv6 route [destination-prefix/length] [next-hop-ipv6 | exit-interface]
```

Examples

```
Router(config)# ipv6 route 2001:db8:1::/64 2001:db8::2
Router(config)# ipv6 route 2001:db8:2::/64 gigabit0/1
Router(config)# ipv6 route 2001:db8:3::/64 gigabit0/0 2001:db8::1
```

IPv6 Default Route Configuration

IPv6 Default Route Syntax

```
Router(config)# ipv6 route ::/0 [next-hop-ipv6 | exit-interface]
```

Examples

```
Router(config)# ipv6 route ::/0 2001:db8::1
Router(config)# ipv6 route ::/0 serial0/0/0
Router(config)# ipv6 route ::/0 gigabit0/1 2001:db8::1
```

Administrative Distance

IPv6 Administrative Distances

- **Connected:** 0
- **Static:** 1
- **OSPFv3:** 110
- **RIPng:** 120

Custom Administrative Distance

```
Router(config)# ipv6 route 2001:db8:1::/64 2001:db8::2 [admin-distance]
```

Example

```
Router(config)# ipv6 route 2001:db8:1::/64 2001:db8::2 50
```

Essential Show Commands

View IPv6 Routing Table

```
Router# show ipv6 route  
Router# show ipv6 route static
```

View Specific Route

```
Router# show ipv6 route 2001:db8:1::/64
```

View IPv6 Interfaces

```
Router# show ipv6 interface brief  
Router# show ipv6 interface gigabit0/0
```

Removing IPv6 Static Routes

Remove Specific Route

```
Router(config)# no ipv6 route 2001:db8:1::/64 2001:db8::2
```

Remove Default Route

```
Router(config)# no ipv6 route ::/0 2001:db8::1
```

IPv6 Route Types

Route Codes in Routing Table

- **C** = Connected
- **L** = Local (interface address)
- **S** = Static
- **O** = OSPFv3
- **R** = RIPng

Example Routing Table Entry

```
S 2001:DB8:1::/64 [1/0]
  via 2001:DB8::2
S ::/0 [1/0]
  via 2001:DB8::1
```

Complete IPv6 Routing Example

Router 1 Configuration

```
! Enable IPv6 routing
ipv6 unicast-routing

! Configure interfaces
interface gigabit0/0
  ipv6 address 2001:db8:1::1/64
  no shutdown

interface gigabit0/1
  ipv6 address 2001:db8:10::1/64
  no shutdown

! Static routes
ipv6 route 2001:db8:2::/64 2001:db8:10::2
ipv6 route ::/0 2001:db8:10::2
```

Router 2 Configuration

```
! Enable IPv6 routing
ipv6 unicast-routing

! Configure interfaces
interface gigabit0/0
 ipv6 address 2001:db8:2::1/64
 no shutdown

interface gigabit0/1
 ipv6 address 2001:db8:10::2/64
 no shutdown

! Static routes
ipv6 route 2001:db8:1::/64 2001:db8:10::1
ipv6 route ::/0 2001:db8:10::1
```

Verification Commands

Test IPv6 Connectivity

```
Router# ping ipv6 2001:db8:1::10
Router# traceroute ipv6 2001:db8:1::10
```

Check IPv6 Neighbors

```
Router# show ipv6 neighbors
```

Verify IPv6 Configuration

```
Router# show running-config | section ipv6
```

Key Points

- **Enable IPv6 routing** with `ipv6 unicast-routing`
- **IPv6 addresses** use 128 bits (vs 32 bits for IPv4)
- **Default route** is `::/0` (vs `0.0.0.0/0` for IPv4)
- **Prefix length** uses `/64` notation (vs subnet mask for IPv4)
- **Next-hop** can be link-local or global unicast address
- **Administrative distance** works same as IPv4

Remember: Always enable IPv6 routing with `ipv6 unicast-routing` before configuring IPv6 routes!

