

# Experiment 1d - Setup iBGP

DE-CIX Academy

Version 1.3

## 1 Purpose

iBGP is simply BGP within one Autonomous System. It is used to redistribute prefixes received from other providers and to redistribute your own or your customers prefixes.

## 2 Network Setup

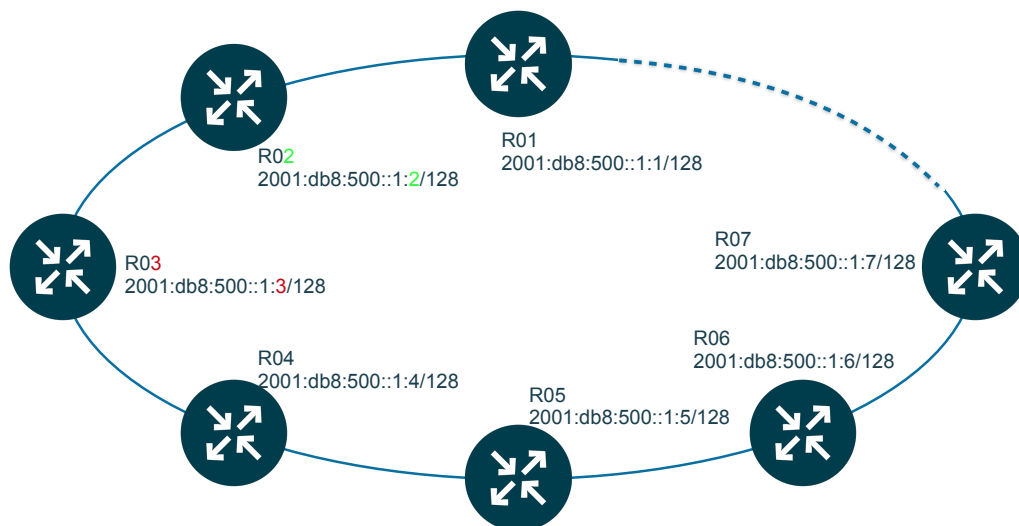


Figure 1: Network Setup

Figure 1 shows the network topology for this experiment. All devices are connected in a ring like structure, each device has two neighbors. Loopback addresses are distributed via an IGP (OSPF or IS-IS).

## 3 Setup iBGP

### 3.1 Tasks:

- Define iBGP peer groups for IPv4 and IPv6
- Configure all parameters needed in the peer group

- Set up iBGP sessions to all other routers on IPv4 and IPv6 using the peer groups
- Check if the sessions are up

### 3.2 To set up iBGP you need to:

- start BGP using your AS number
- define one iBGP peer group for IPv4 and one for IPv6
- configure all iBGP neighbors

Information you need:

- Your AS number: **64500**

The IP addresses of your iBGP neighbors you can find out by doing a *show ip route ospf* or *show ip route isis* (depending on the IGP in use) and look for /32 prefixes for IPv4. For IPv6 do a *show ipv6 route ospf6* or *show ipv6 route isis* and look for /128 prefixes.

### 3.3 To configure iBGP in config mode you need:

**router bgp <asnumber>** to start BGP with <asnumber> as your AS number

**neighbor <name> peer-group** to start configuring a peer group named <name>

**neighbor <name> remote-as <asnumber>** to set a common remote AS number for all peer group members. If configuring iBGP <asnumber> is **your** AS number.

**neighbor <name> update-source <interface>** make BGP use the IP address of <interface> as source IP when setting up connections. Use your loopback interface name (*dummyo*) here.

**neighbor <name> next-hop-self** makes iBGP to set this routers IP (of *dummyo*) for next-hop address when distributing prefixes

**neighbor <name> send-community both** to forward BGP communities. We have not covered them yet, but you will need this later on.

**neighbor <ip address> peer-group <name>** sets up a BGP session to <ip address> as a member of peer-group <name>. That means all configs from <name> are copied.

**address-family ipv6** switches into IPv6 context. You need to activate explicitly distributing IPv6 prefixes in this context.

**address-family ipv4** switches into IPv4 context. You do not need to activate the distribution of IPv4 prefixes via IPv4 - this is activated by default. But you need to *deactivate* the distribution of IPv6 addresses.

**neighbor <ipv6 address> activate** in address-family context activates distribution of IPv6 prefixes in this context.

**neighbor <ipv4 address> activate** in address-family context activates distribution of IPv4 prefixes. Not needed in IPv4 context.

**no neighbor <ipv6 address> activate** in address-family context prevents distribution of IPv6 prefixes.

**no neighbor <ipv4 address> activate** in address-family context prevents distribution of IPv4 prefixes.

It is recommended to distribute prefixes only in their own context. So you usually configure:

```
...
address-family ipv4 unicast
  neighbor <ipv4 address> activate
  ... (for all IPv4 neighbors)
  no neighbor <ipv6 address> activate
  ... (for all IPv6 neighbors)
exit-address-family
address-family ipv6 unicast
  no neighbor <ipv4 address> activate
```

```
... (for all IPv4 neighbors)
neighbor <ipv6 address> activate
... (for all IPv6 neighbors)
exit-address-family
```

In FRRouting you can configure this also for a whole peer group and you can change the default so IPv4 is *not* activated automatically. See solution below.

### 3.4 Commands to check if iBGP is running:

**show ip bgp summary** shows you all configured neighbor and if sessions to them are up or not.

**show ip bgp neighbors** show you detailed information about all BGP neighbors (long!)

**show ip bgp neighbors <ip address>** same as above, but only for one neighbor. Preferred.

## 4 Solution

### 4.1 IPv4

```
router bgp 64500
no bgp default ipv4-unicast
neighbor internal peer-group
neighbor internal remote-as 64500
neighbor internal update-source dummy0
address-family ipv4 unicast
    neighbor internal activate
exit-address-family
neighbor 172.16.1.YY peer-group internal
...
```

Where YY are the IPv4 addresses of all other routers in the network (except your own).

### 4.2 IPv6

```
router bgp 64500
no bgp default ipv4-unicast
neighbor internal-v6 peer-group
neighbor internal-v6 remote-as 64500
neighbor internal-v6 update-source dummy0
address-family ipv6 unicast
    neighbor internal-v6 activate
exit-address-family
neighbor 2001:db8:500::1:Y peer-group internal-v6
...
```

Where Y are the IPv6 addresses of all other routers in the network (except your own).

## 5 Slides

## Setup iBGP for IPv4

- We use *peer-groups* for configuration
- All *common* config statements go into the peer-group
- All individual statements to into the peer entry

```
router bgp 64500
  no bgp default ipv4-unicast

  neighbor internal peer-group
  neighbor internal remote-as 64500
  neighbor internal update-source dummy0
  address-family ipv4 unicast
    neighbor internal activate
  exit-address-family

  neighbor 172.16.1.yy peer-group internal
  ...
```

- Repeat the last line for all neighbors
- For yy use the router ids of the other routers (all except your own)
- We change the default so IPv4 is not automatically activated

Show commands:

- show bgp ipv4 summary
- show bgp ipv4 neighbors
- show bgp ipv4 neighbor 172.16.1.yy

## Setup iBGP for IPv6

- We again use a *peer-group*
- You need separate peer-groups for IPv4 and IPv6
- All *common* config statements go into the peer-group
- All individual statements to into the peer entry

```
router bgp 64500
  no bgp default ipv4-unicast

  neighbor internal-v6 peer-group
  neighbor internal-v6 remote-as 64500
  neighbor internal-v6 update-source dummy0
  address-family ipv6 unicast
    neighbor internal-v6 activate
  exit-address-family

  neighbor 2001:db8:500::1:yy peer-group internal-v6
  ...
```

- See the *address-family* entry?
- This is about what is being *transported* via BGP
- We have to activate IPv6
- and deactivate (*no bgp...*) IPv4 (we simply change the default)

Show commands:

- show bgp ipv6 summary
- show bgp ipv6 neighbors
- show bgp ipv6 neighbor 2001:db8:500::1:yy