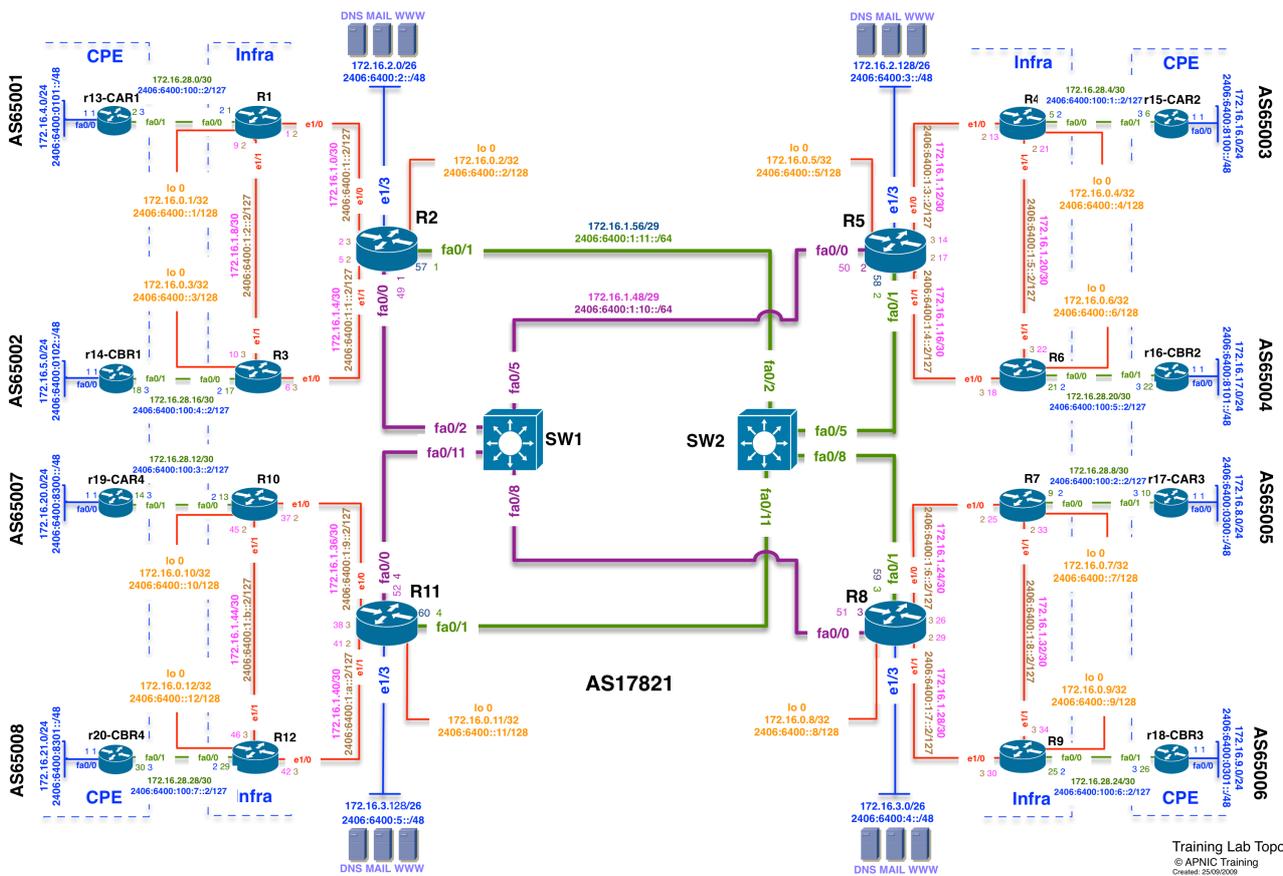




# Module 4 - iBGP Configuration(RR)

## Topology introduction:

- The topology below shows 4 regional networks comprised of a core POP and 2 aggregation POPs (edge routers).
- Edge routers aggregate downstream customers.
- The regional networks are interconnected with redundant transport links.



# Lab Tasks

---

In this lab, we will configure iBGP by using Route Reflector (RR) instead of the full mesh iBGP sessions. And we will use “peer-groups” in this lab to scale the iBGP neighbors.

In each region, the core routers are Route Reflectors and the edge POP routers in that region are its RR clients. For example, in Region 2, R5 is the Route Reflector, R4 and R6 are its clients.

The prefix announcement part will be kept the same from last module. The prefixes in the BGP routing table must be the same as module 3.

Customer Side P-2-P	Datacentre
R1 => 2406:6400:100:0::/64	R2 => 2406:6400:2::/48
R3 => 2406:6400:100:4::/64	R5 => 2406:6400:3::/48
R4 => 2406:6400:100:1::/64	R8 => 2406:6400:4::/48
R6 => 2406:6400:100:5::/64	R11 => 2406:6400:5::/48
R7 => 2406:6400:100:2::/64	
R9 => 2406:6400:100:6::/64	
R10 => 2406:6400:100:3::/64	
R12 => 2406:6400:100:7::/64	

# Lab Exercise

---

## Step 1 - Remove full-mesh iBGP Configuration from previous module:

We will remove all the iBGP sessions from module 3.

### Example configuration on R1:

```
config t
router bgp 17821
address-family ipv6 unicast          !Please do the same for IPv4 as well
no neighbor 2406:6400::2
no neighbor 2406:6400::3
no neighbor 2406:6400::4
no neighbor 2406:6400::5
no neighbor 2406:6400::6
no neighbor 2406:6400::7
no neighbor 2406:6400::8
no neighbor 2406:6400::9
no neighbor 2406:6400::10
no neighbor 2406:6400::11
no neighbor 2406:6400::12
```

## Step 2 - Configure iBGP neighbors in peer groups:

We will configure iBGP neighbors in peer groups to scale BGP configuration requirement.

### Edge POP routers - example configuration on R4:

- On edge POP routers which are clients, they will form BGP neighbor with RR, we define the group name `RRv4` for IPv4 and `RRv6` for IPv6.

```
config t
router bgp 17821
```

- First create the peer group `RRv6`

```
address-family ipv6          !Please do the same for IPv4 as well
neighbor RRv6 peer-group
neighbor RRv6 remote-as 17821
neighbor RRv6 update-source loopback 0
```

- Add the peer to the peer group `RRv6`

```
neighbor 2406:6400::5 peer-group RRv6
neighbor 2406:6400::5 description iBGP with R5
neighbor 2406:6400::5 activate
```

## Core routers - example configuration on R5:

- On core routers which are RRs, they will form BGP neighbor with their clients and the other core routers, we define the client group name `RRv4-CLIENT` for IPv4 and `RRv6-CLIENT` for IPv6, core routers' group as `iBGPv4-CORE` for IPv4 and `iBGPv6-CORE` for IPv6.

```
config t
router bgp 17821
address-family ipv6                !Please do the same for IPv4 as well
```

- Create the peer group `RRv6-CLIENT`

```
neighbor RRv6-CLIENT peer-group
neighbor RRv6-CLIENT remote-as 17821
neighbor RRv6-CLIENT update-source loopback 0
```

- Add the client peers to the peer group `RRv6-CLIENT`

```
neighbor 2406:6400::4 peer-group RRv6-CLIENT
neighbor 2406:6400::4 description iBGP with R4
neighbor 2406:6400::4 activate
neighbor 2406:6400::6 peer-group RRv6-CLIENT
neighbor 2406:6400::6 description iBGP with R6
neighbor 2406:6400::6 activate
```

- Create the peer group `iBGPv6-CORE`

```
neighbor iBGPv6-CORE peer-group
neighbor iBGPv6-CORE remote-as 17821
neighbor iBGPv6-CORE update-source loopback 0
```

- Add the peers in the peer group `iBGPv6-CORE`

```
neighbor 2406:6400::2 peer-group iBGPv6-CORE
neighbor 2406:6400::2 description iBGP with R2
neighbor 2406:6400::2 activate
neighbor 2406:6400::8 peer-group iBGPv6-CORE
neighbor 2406:6400::8 description iBGP with R8
neighbor 2406:6400::8 activate
neighbor 2406:6400::11 peer-group iBGPv6-CORE
neighbor 2406:6400::11 description iBGP with R11
neighbor 2406:6400::11 activate
```

### Step 3 - Configure Route Reflector:

On the core routers (Router2, Router5, Router8, Router11), configure the RR configuration:

```
neighbor RRv6-CLIENT route-reflector-client
```

Defining all members of `RRv6-CLIENT` peer group as RR clients. Please note if there are any other peer group or BGP peer they will be considered as RR non-client. In our case another peer group `iBGPv6-CORE` and they will be RR non-client.

### Example configuration on a Core Router (RR):

```
config t
router bgp 17821
address-family ipv6          !Please do the same for IPv4 as well
neighbor RRv6-CLIENT route-reflector-client
```

Note: There is no configuration needed on POP routers (RR-clients) in this step.

Please remember to save the configuration.

### Step 4 - Double check the Network Advertisement:

Network advertisement is kept from last module (module 3 iBGP full mesh).

### Step 5 - Verify iBGP Configuration:

#### Verify IPv4 BGP configuration:

```
show bgp ipv4 unicast summary ! List IPv4 BGP peers
```

```
show bgp ipv4 unicast ! List IPv4 routes in BGP Table
```

```
show bgp ipv4 unicast <prefix/length> ! List IPv4 specific routes
```

`show ip route bgp` ! Check IPv4 routes learned via BGP

`show ip route` ! Check your IPv4 routing table (best paths)

### Verify IPv6 BGP configuration:

`show bgp ipv6 unicast summary` ! List IPv6 BGP peers

`show bgp ipv6 unicast` ! List IPv6 routes in BGP Table

`show bgp ipv6 unicast <prefix/length>` ! List IPv6 specific routes

`show ipv6 route bgp` ! Check IPv6 routes learned via BGP

`show ipv6 route` ! Check your IPv6 routing table (best paths)

`show bgp ipv6 unicast neighbors <neighbour-address> advertised-routes` ! Check routes advertised to your neighbour

`show bgp ipv6 unicast neighbors <neighbour-address> routes` ! Check routes learned from your neighbours

=====