Experiment 1a - Setup an IGP (OSPF)

DE-CIX Academy

Version 1.1

1 Purpose

An IGP (Interior Gateway Protocol) distributes the interface IP addresses within an Autonomous System. This is needed so iBGP can connect.

2 Network Setup

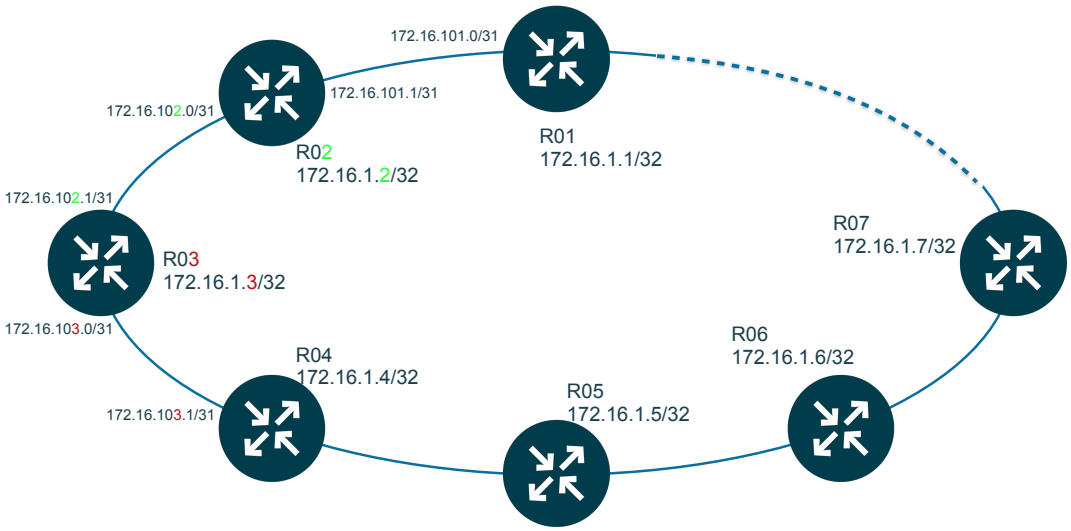


Figure 1: Network Setup

Figure 1 shows the network topology for this experiment. All devices are connected in a ring like structure, each device has two neighbors.

3 Slides

Setup OSPF

- OSPF is configured on top of ipv4
- So you configure it on *networks*, not on interfaces
- for each connected network you want to run it on.
- OSPF has a concept of *areas* - for our simple setup we only use *Area 0* (also called the backbone-area).

```
show interface brief

configure

router ospf
  network 172.16.1.X/32 area 0
  network 172.16.1XX.0/31 area 0
  network 172.16.1YY.0/31 area 0
```

Parameters here are:

- **XX** = your router ID (like 01, 02, ...)

Show commands:

- **show ip route connected**
  to list your interface networks
- **show ip route ospf**
- **show ip ospf**
- **show ip ospf interface**
- **show ip ospf neighbor**
- **show ip route**

4 Your Device

Please now connect to your device and check your IP adresses. Fill out the following table. The commands you need are *show running* and *show interface*:

	Router Name	**Interface Name**	**IP Address**
Loopback:		*loopback0*	
Interface to the left:			
Interface to the right:			

5 Setup OSPF

5.1 To set up OSPF you need to:

- Start the OSPF process
- Add networks where OSPF should run to the process

5.2 The commands you need are:

show ip route ospf shows you all prefixes routed within OSPF

show ip ospf gives you information about the OSPF process

show ip ospf interface shows details about each interface where OSPF is running

show ip ospf neighbor shows disovered neighbor routers which run OSPF

5.3 To configure OSPF in config mode you need:

router ospf starts the OSPF process

network <a.b.c.d/mask> area <N> enables OSPF on the given network with area *N* (use area 0, the backbone area). You need one network statement for each network you want to run OSPF on including the dummy/loopback interface.

5.4 Tasks:

- Enable OSPF on the right, left, and dummy interface
- Check the routing table after all routers have OSPF enabled. For this, do a *show ip route ospf* and take note which loopback addresses are routed throuhg your left and which through your right interface
- Do a *ping* to some of the other loopback addresses.
- Do a *traceroute* to the other loopback addresses and take note which way the packets go
- Shut down one of your interfaces (command *shutdown* in interface context in config mode), do the same traceroutes again. Has anything changed?
- Unshut (command: *no shutdown*) the same interface and try again.
- Do all a *show ip route ospf*, the one of the participants shuts down one interface. Do all the *show ip route ospf* again and note what has changed.

6 Solution

6.1 Solution for FRRouting

```
  router ospf
    network 172.16.1.X/32 area 0
    network 172.16.1XX.0/31 area 0
    network 172.16.1YY.0/31 area 0
```

Where:

- *XX* is your router (like 01, 02, ...)
- *YY* is your neighbor on the left

6.2 Solution for Juniper

```
protocols {
  ospf {
        area 0.0.0.0 {
            interface em0.0;
            interface em1.0;
            interface lo0.0;
        }
    }
}
```

6.3 Solution for Mikrotik