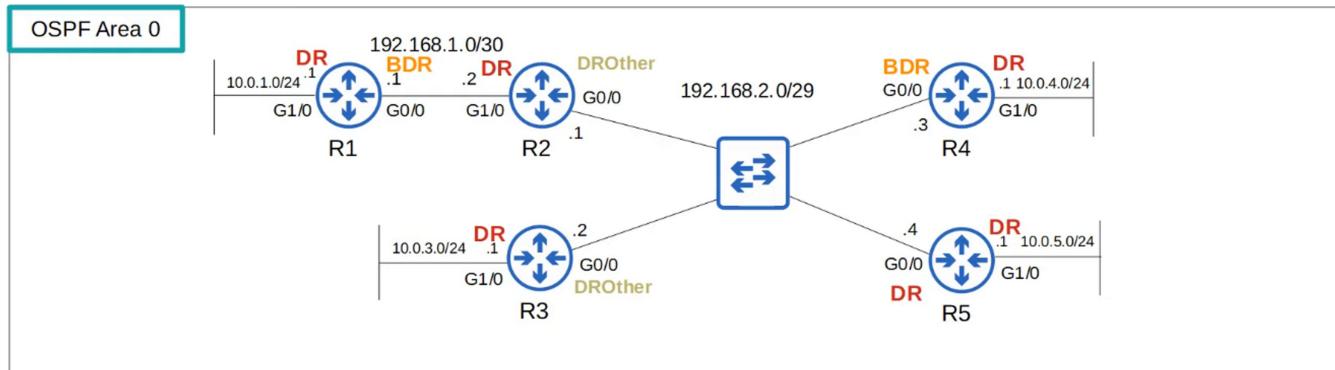


## What are OSPF Network Types?

Different network types require different **OSPF mechanisms** for **neighbor discovery** and **LSA exchange**. OSPF adjusts itself based on whether it's running over Ethernet, Serial, or Frame Relay.

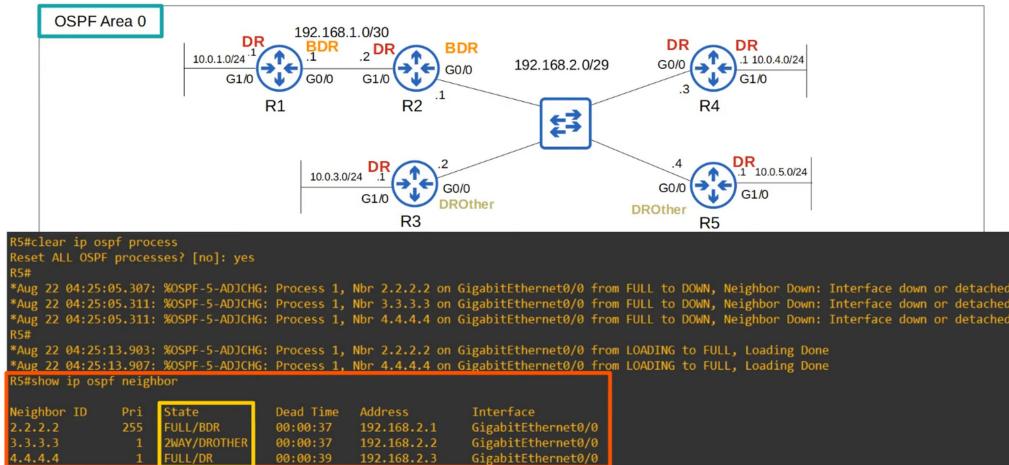


### Let's Understand Each Type:

- ◆ **1. Broadcast Network**
- **Example:** Ethernet, Fast Ethernet, Gigabit
- Supports automatic **Hello** packets using multicast 224.0.0.5
- **DR/BDR election happens** to reduce LSA flooding
- Suitable for LANs with **multiple routers**
- ❖ OSPF treats Ethernet as **broadcast** by default.

```
R2(config)#int g0/0
R2(config-if)#ip ospf priority ?
<0-255> Priority
```

```
R2(config-if)#ip ospf priority 255
```

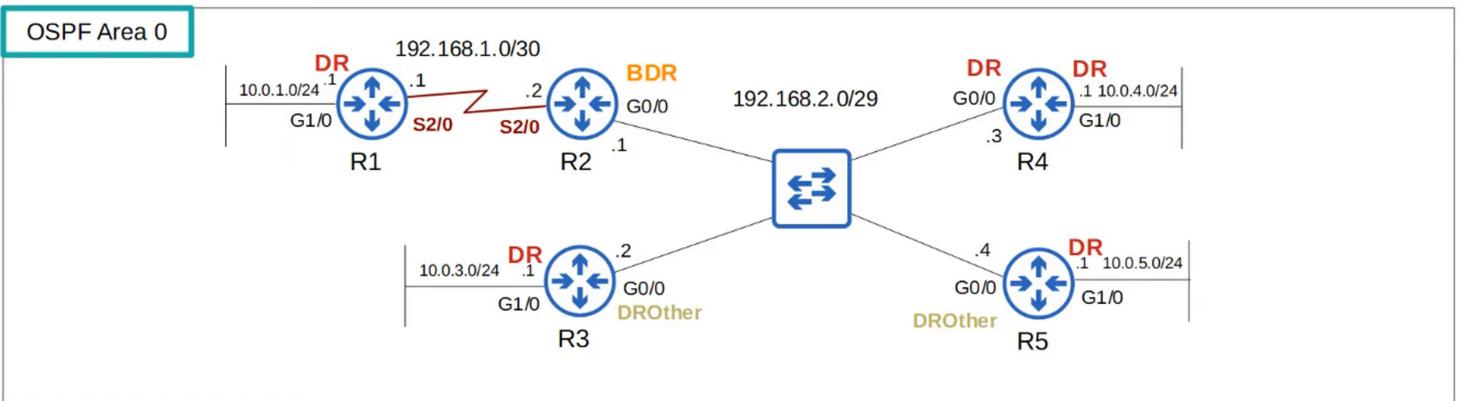


## ◆ 2. Non-Broadcast (NBMA)

- **Example:** Frame Relay, X.25, ATM
  - Does **not support multicast** Hello packets
  - Requires **manual neighbor configuration**
  - Still uses **DR/BDR**
  - Often seen in **hub-and-spoke** WAN topologies
- R1(config-router)# neighbor 10.0.0.2 priority 100

## ◆ 3. Point-to-Point

- **Example:** Serial interfaces (PPP, HDLC)
- No need for DR/BDR — only 2 routers involved
- OSPF automatically discovers neighbor
- Very simple setup
- ◆ OSPF sends LSAs **directly to the only other router** on the link.





## Serial Interfaces



```
R1(config)#interface s2/0
R1(config-if)#clock rate ?
With the exception of the following standard values not subject to rounding,
1200 2400 4800 9600 14400 19200 28800 38400
56000 64000 128000 2015232
accepted clockrates will be bestfitted (rounded) to the nearest value
supportable by the hardware.

<246-8064000>    DCE clock rate (bits per second)

R1(config-if)#clock rate 64000
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shut
```

```
R1(config)#int s2/0
R1(config-if)#encapsulation ppp
R1(config-if)#do show interface s2/0
Serial2/0 is up, line protocol is up
  Hardware is M4T
  Internet address is 192.168.1.1/24
  MTU 1500 bytes, BW 1544 Kbit/sec, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP  LCP Open
```

```
R1(config-if)#ip ospf network ?
  broadcast          Specify OSPF broadcast multi-access network
  non-broadcast      Specify OSPF NBMA network
  point-to-multipoint Specify OSPF point-to-multipoint network
  point-to-point      Specify OSPF point-to-point network
```

### What is HDLC (High-Level Data Link Control)?

HDLC stands for **High-Level Data Link Control**. It is a **Layer 2 (Data Link Layer)** WAN protocol used to encapsulate data on **serial interfaces** in point-to-point connections. It is used for communication over **synchronous** and **asynchronous** links and ensures **reliable data transfer** between two devices.

### Why Encapsulation Matters

Role	Benefit
Frame identification	Ensures routers know where a frame starts and ends
Error detection	Uses CRC in the FCS field

Payload interpretation    Protocol field tells receiver what's inside  
Compatibility (Cisco only) Allows Layer 3 data to move over Cisco serial links

- **Encapsulation** = wrapping data with control information
- Cisco HDLC adds a **Protocol field** → makes it **Cisco proprietary**
- Used to **send IP packets over serial interfaces**
- Ensures **correct delivery, frame recognition, and interpretation**

मान लीजाएँ एक Student का letter (IP Packet) है।

1. Student letter लिखिता है (Layer 3 Data)
2. उसे एक envelope में डालता है (Layer 2 Encapsulation)
3. उस पर To/From address लिखिता है (Header fields)
4. एक signature और stamp भी लगाता है (FCS)
5. Courier उसे दूसरे friend को पहुँचाता है (Point-to-Point Serial Link)