

## What is Router ID (RID) in OSPF?

The **Router ID (RID)** is a unique **32-bit value (written like an IP address)** that identifies each router in an OSPF domain. It's like a name tag for routers in the OSPF world.

## Purpose of Router ID

- Uniquely identifies a router within the **OSPF network**
- Used in **LSAs (Link-State Advertisements)** to show the origin of routing info
- Helps routers **elect a DR/BDR** in broadcast networks
- Used as the **root node** when building the SPF tree
  - ◆ Think of the Router ID like a "router's signature" on every OSPF update.

## Router ID Selection Order (Automatic)

If not manually configured, OSPF chooses the RID in the following order:

1. **Manually configured router ID**  
→ Highest priority (set using router-id command)
2. **Highest IP address on a loopback interface**  
→ Loopbacks are preferred because they're more stable.
3. **Highest IP address on an active physical interface**  
→ Used if no loopback is configured.



## Example:

```
R1(config)# router ospf 1  
R1(config-router)# router-id 1.1.1.1
```

After setting the RID manually, restart the OSPF process for it to take effect:

```
R1(config-router)# clear ip ospf process
```

## Why Router ID Is Important

| Use Case               | Why It Matters                               |
|------------------------|--|
| SPF Calculation        | Used as the root of the shortest path tree   |
| LSA Origination        | Identifies which router created which LSA    |
| Neighbor Relationships | Helps in distinguishing between routers      |
| DR/BDR Election        | Higher RID wins in case of tie in priorities |

## View Current Router ID

```
show ip ospf
```

## Summary

| Attribute      | Value/Note  |
|----------------|---|
| Format         | 32-bit, like an IPv4 address                            |
| Default Method | Highest loopback or interface IP                        |
| Manual Config  | router-id under OSPF config                             |
| Required       | Yes, must be <b>unique per router</b> in an OSPF domain |