

## OSPF Packet Types:

All OSPF packets share a common OSPF Header. This header allows the receiving router to validate and process the packets. The format of common OSPF header is:

```
✓ Open Shortest Path First
  ✓ OSPF Header
    Version: 2
    Message Type: Hello Packet (1)
    Packet Length: 48
    Source OSPF Router: 192.168.12.1
    Area ID: 0.0.0.0 (Backbone)
    Checksum: 0x8298 [correct]
    Auth Type: Null (0)
    Auth Data (none): 0000000000000000
```

**Version:** OSPF version 2 for IPV4.

**Message Type:** Type of OSPF packet, 1 for Hello Packet, 2 for Database Descriptor Packet, 3 for Link State Request Packet, 4 for Link State Update Packet, and 5 for Link State Ack Packet.

**Packet Length:** Total length of OSPF Packet.

**Sources OSPF Router:** The Router ID of the Advertising Router.

**Area ID:** 32-bit Area ID assigned to the interface sending the OSPF packet.

**Checksum:** Standard IP Checksum of OSPF Packet.

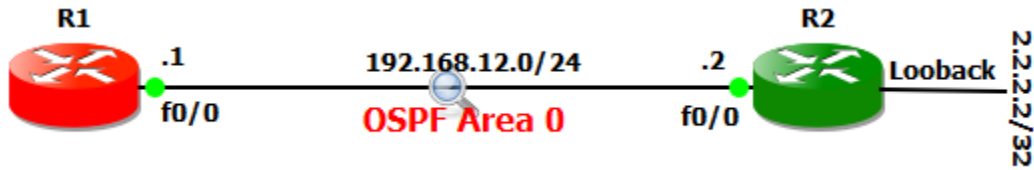
**Auth Type:** Authentication Type, 0 for no Password, 1 for Plain-text password and 2 for MD5.

**Auth Data:** Authentication data to verify the packet's integrity.

There are five different types of OSPF packets Hello, DBD, LSR, LSU and LSack packets.



To check all five different types of OSPF packets first start Wireshark capture and then enable OSPF protocols on both routers R1 and R2.



<b>R1 Configuration</b>
R1(config)#router ospf 1 R1(config-router)#network 192.168.12.0 0.0.0.255 area 0
<b>R2 Configuration</b>
R2(config)#router ospf 1 R2(config-router)#network 192.168.12.0 0.0.0.255 area 0 R2(config-router)#network 2.2.2.2 0.0.0.0 area 0
R1#show ip route ospf
R1#show ip ospf neighbor
R1#show ip ospf database
R1#show ip ospf database router 2.2.2.2
R2#show ip route ospf
R2#show ip ospf neighbor
R2#show ip ospf database

### 1. Hello Packet:

Hello packets are OSPF packet Type 1. These packets are multicast periodically to 224.0.0.5 multicast address on all interfaces enabling dynamic discovery of neighbors and maintain neighbor relationships.

```

v OSPF Hello Packet
  Network Mask: 255.255.255.0
  Hello Interval [sec]: 10
  > Options: 0x12, (L) LLS Data block, (E) External Routing
  Router Priority: 1
  Router Dead Interval [sec]: 40
  Designated Router: 192.168.12.1
  Backup Designated Router: 192.168.12.2
  Active Neighbor: 2.2.2.2
  
```

## 2. Database Descriptor Packet:

The DBD packets are OSPF packet Type 2. The OSPF router summarizes the local database and the DBD packets carry a set of LSAs belonging to the database. When a neighbor sees an LSA that is more recent than its own database copy, it requests this newer LSA from the neighbor.

```

  Open Shortest Path First
  OSPF Header
    Version: 2
    Message Type: DB Description (2)
    Packet Length: 32
    Source OSPF Router: 192.168.12.1
    Area ID: 0.0.0.0 (Backbone)
    Checksum: 0xcd2 [correct]
    Auth Type: Null (0)
    Auth Data (none): 0000000000000000
  OSPF DB Description
    Interface MTU: 1500
    Options: 0x52, O, (L) LLS Data block, (E) External Routing
    DB Description: 0x07, (I) Init, (M) More, (MS) Master
      .... 0... = (R) OOBResync: Not set
      .... .1.. = (I) Init: Set
      .... ..1. = (M) More: Set
      .... ...1 = (MS) Master: Yes
    DD Sequence: 2942

```

## 3. Link State Request Packet:

The Link State Request (LSR) packet is an OSPF packet Type 3. After DBD packets exchange process, the router may find it does not have an up-to-date database. The LSR packet is used to request pieces of neighbor database that is more up-to-date.

```

  Open Shortest Path First
  OSPF Header
    Version: 2
    Message Type: LS Request (3)
    Packet Length: 36
    Source OSPF Router: 2.2.2.2
    Area ID: 0.0.0.0 (Backbone)
    Checksum: 0x6080 [correct]
    Auth Type: Null (0)
    Auth Data (none): 0000000000000000
  Link State Request
    LS Type: Router-LSA (1)
    Link State ID: 192.168.12.1
    Advertising Router: 192.168.12.1

```

#### 4. Link State Update Packet:

Link State Update (LSU) packets are OSPF packet Type 4. These packets implement the flooding of LSAs. Each LSA contains routing, metric and topology information to describe a portion of OSPF network. The local router advertises LSA within an LSU packet to its neighboring routers. In addition, the local router advertises the LSU packet with information in response to an LSR packet.

```

  Open Shortest Path First
  OSPF Header
    Version: 2
    Message Type: LS Update (4)
    Packet Length: 64
    Source OSPF Router: 192.168.12.1
    Area ID: 0.0.0.0 (Backbone)
    Checksum: 0xe148 [correct]
    Auth Type: Null (0)
    Auth Data (none): 0000000000000000
  LS Update Packet
    Number of LSAs: 1
    LSA-type 1 (Router-LSA), len 36
      .000 0000 0001 1000 = LS Age (seconds): 24
      0... .... .... .... = Do Not Age Flag: 0
      > Options: 0x22, (DC) Demand Circuits, (E) External Routing
      LS Type: Router-LSA (1)
      Link State ID: 192.168.12.1
      Advertising Router: 192.168.12.1
      Sequence Number: 0x80000004
      Checksum: 0x4587
      Length: 36
      > Flags: 0x00
      Number of Links: 1
      Type: Stub      ID: 192.168.12.0      Data: 255.255.255.0      Metric: 1
        Link ID: 192.168.12.0 - IP network/subnet number
        Link Data: 255.255.255.0
        Link Type: 3 - Connection to a stub network
        Number of Metrics: 0 - TOS
        0 Metric: 1

```

#### 5. Link State Acknowledgment Packet:

Link State Acknowledgment (LSAck) packets are OSPF packet Type 5. OSPF requires acknowledgment for the receipt of each LSA. Multiple LSAs can be acknowledged in a single LSAck packet.

```

  Open Shortest Path First
  OSPF Header
    Version: 2
    Message Type: LS Acknowledge (5)
    Packet Length: 44
    Source OSPF Router: 192.168.12.1
    Area ID: 0.0.0.0 (Backbone)
    Checksum: 0x48fe [correct]
    Auth Type: Null (0)
    Auth Data (none): 0000000000000000

```