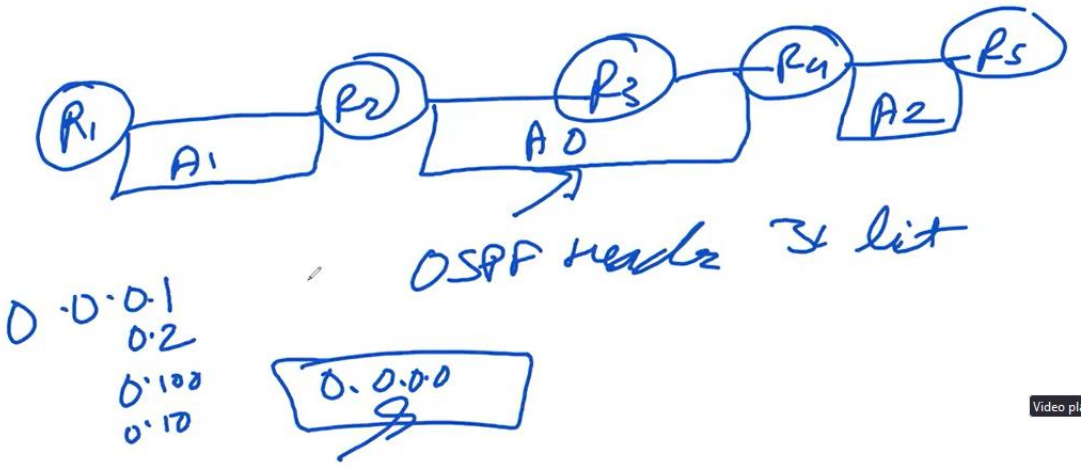
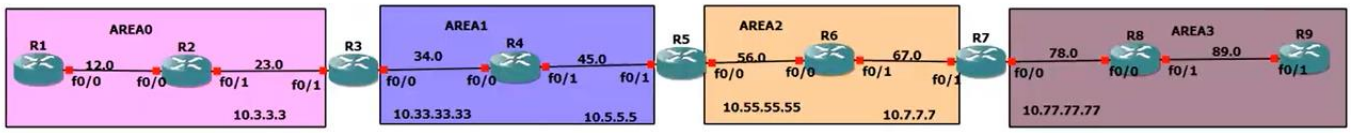
OSPF



Topology



#R1

```
*Mar  1 00:11:57.535: %SYS-5-CONFIG_I: Configured from console by console
R1#sh ip os nei

Neighbor ID     Pri   State           Dead Time   Address         Interface
10.2.2.2          1   EXSTART/DR      00:00:38    172.16.12.2     FastEthernet0/0
R1#
```

#R3

```
  Incoming update filter list for all interfaces is not set
  Router ID 10.33.33.33
  It is an area border router
  Number of areas in this router is 2. 2 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.3.3.3 0.0.0.0 area 0
    10.33.33.33 0.0.0.0 area 1
    172.16.23.0 0.0.0.255 area 0
    172.16.34.0 0.0.0.255 area 1
 Reference bandwidth unit is 100 mbps
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.2.2.2             110      00:00:26
    10.1.1.1             110      00:00:26
    10.4.4.4             110      00:06:25
    10.5.5.5             110      00:05:18
    10.33.33.33          110      00:07:02
  Distance: (default is 110)

R3#
```

** The R3 router is connected to the area 0 that's way its called area border router

#R5

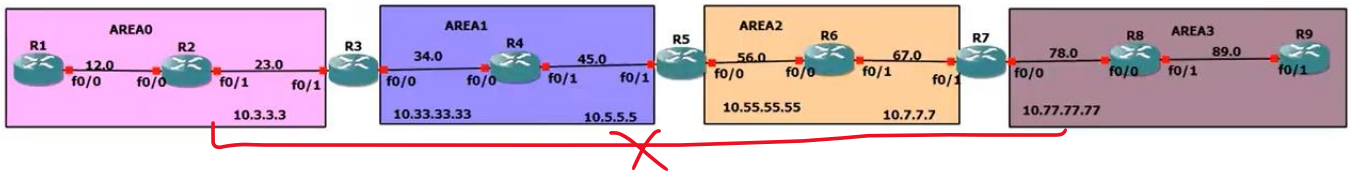
```
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 10.5.5.5
  Number of areas in this router is 2. 2 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.5.5.5 0.0.0.0 area 1
    10.55.55.55 0.0.0.0 area 2
    172.16.45.0 0.0.0.255 area 1
    172.16.56.0 0.0.0.255 area 2
 Reference bandwidth unit is 100 mbps
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.6.6.6             110      00:04:37
    10.4.4.4             110      00:06:05
    10.5.5.5             110      00:05:35
    10.33.33.33          110      00:00:48
    100.7.7.7            110      00:03:45
  Distance: (default is 110)

R5#
```

** Its also connected BW 2 ip subnets but its not area border router (bcz router connected to area 0 is ABR)

#R9

```
R9#
R9#sh ip rou os
     172.16.0.0/24 is subnetted, 2 subnets
O       172.16.78.0 [110/20] via 172.16.89.8, 00:03:17, FastEthernet0/1
     10.0.0.0/32 is subnetted, 3 subnets
O       10.8.8.8 [110/11] via 172.16.89.8, 00:03:17, FastEthernet0/1
O       10.77.77.77 [110/21] via 172.16.89.8, 00:03:17, FastEthernet0/1
R9#
```

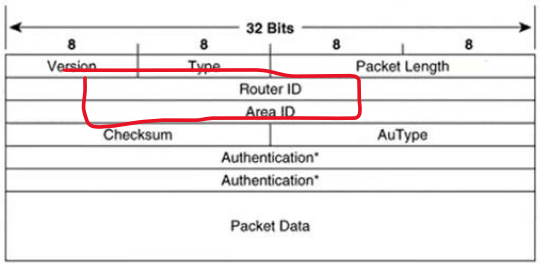
** Its doesn't have routes of R6 R5 and other router info bcz its not connected to the area 0



The Packet Header

All OSPF packets begin with a 24-octet header, as shown in Figure 9.48.

Figure 9.48. The OSPF packet header.



** the ospf header is having 32 bit length (if all the bits in ospf id will become 0 so its called backbone area)
** no other area's will not become backbone area bcz its number will changes

If we want other area info means we have to config Virtual-Link

#R3

```
R3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#
R3(config)#router ospf 3
R3(config-router)#area 1 virtual-link 10.5.5.5
R3(config-router)#^Z
R3#
```

#R5

```
R5#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R5(config)#
R5(config)#router ospf 5
R5(config-router)#area 1 virtual-link 10.33.33.33
R5(config-router)#^Z
```

** now its ABR now

```
 Router ID 10.5.5.5
 It is an area border router
 Number of areas in this router is 3. 3 normal 0 stub 0 nssa
 Maximum path: 4
 Routing for Networks:
   10.5.5.5 0.0.0.0 area 1
   10.55.55.55 0.0.0.0 area 2
   172.16.45.0 0.0.0.255 area 1
   172.16.56.0 0.0.0.255 area 2
```

config same on the R7

#R5

Router ospf 5
Area 2 virtual-link 10.7.7.7

#R7

Router ospf 7
Area 2 virtual-link 10.55.55.55