

# PRACTICAL : OSPF (OPEN SHORTEST PATH FIRST)

## A BASICS

RIP - DVR } designed to run in small n/w  
 EIGRP - EDVR }  
 OSPF - LSRP (Dij Algo) } designed to run in large n/w

① OSPF is an open standard routing Protocol.

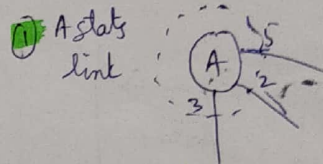
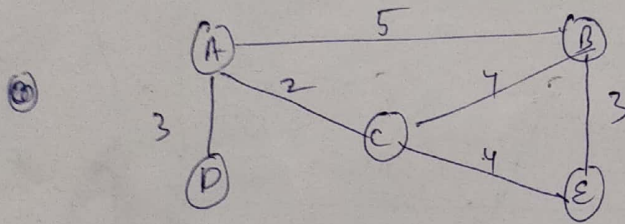
• when we have multiple routers & not all of them are CISCO, then we cannot use EIGRP (becoz it is a CISCO Protocol)

• If n/w is large, then we cant use RIP, RIPv2. Only OSPF

② OSPF works on Dijkstra algorithm (Based on LINK STATE ROUTING)  
 Short Path Calculation

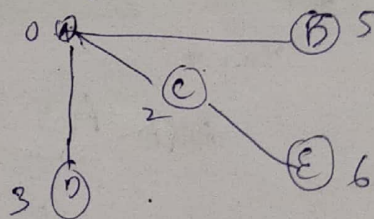
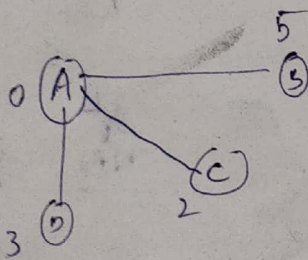
③ OSPF is the first link state routing Protocol

In link state routing, if each node in the domain has entire topology, the node can use Dijkstra's algo to build a routing table.



② Dissemination of LSAs to every other router called Flooding in efficient & reliable way.

③ Formation of shortest Path tree : Dijkstra's algo



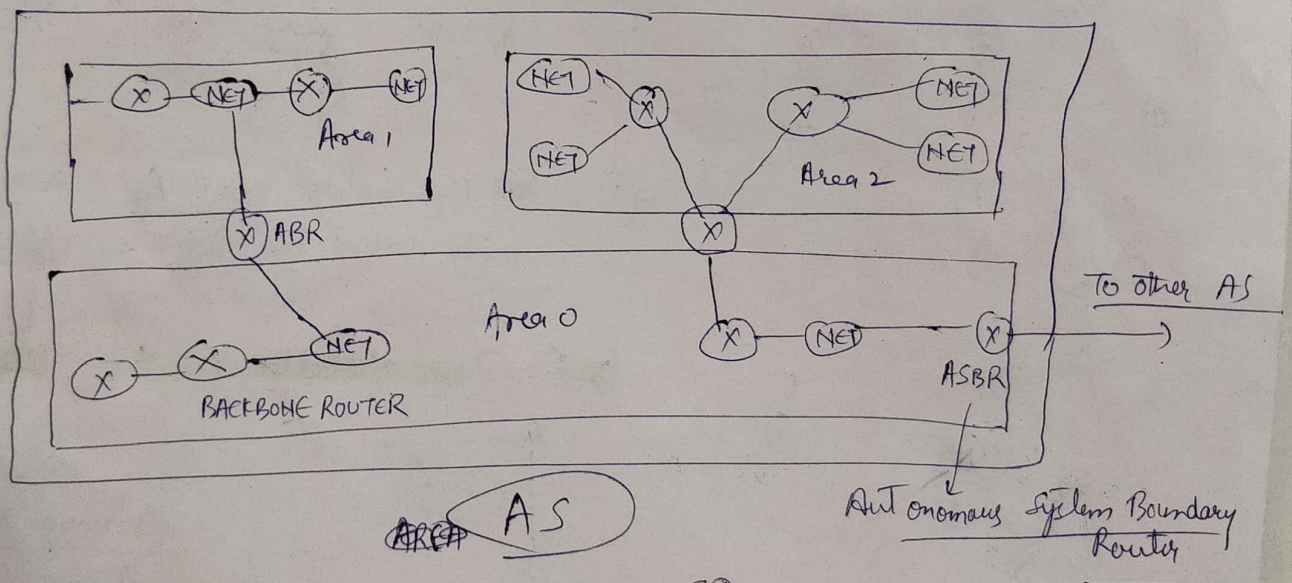
Spanning Tree or  
 SPF Tree  
 Shortest Path first Tree

④ ROUTING TABLE For Node A

Node	Cost	NEXT ROUTER (via)
A	0	
B	5	
C	2	
D	3	
E	6	C



- (B) AREA - OSPF divided an autonomous system into areas. An area is a collection of n/w, hosts & routers all within an AS.
- An autonomous system can be divided into different areas.
  - Routers inside an area flood area with routing info.
  - At the border of an area, special routers called Area Border Routers (ABR) disseminate inform to other areas.
  - Among the areas inside AS is a special area called Backbone. Backbone serves as a primary area & other's areas called Secondary areas.
  - Routers inside the Backbone area are called Backbone routers.

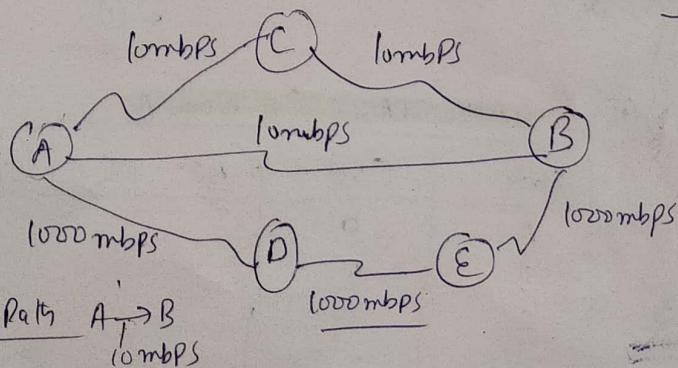


(C) OSPF COST

A → B

• DVR Algo - optimal Path A → B

• LSR (OSPF) - A → D → E → B

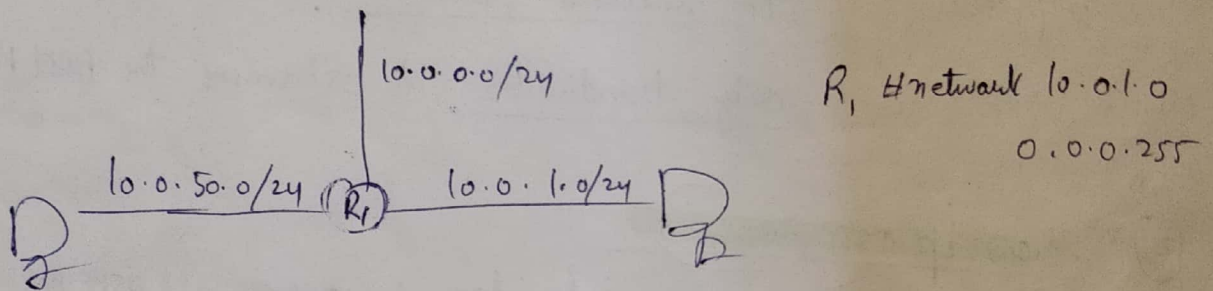




③ wild card Mask - are used to specify a range of n/w address.

They are commonly used with Routing Protocols (like OSPF) & ACLs

- Just like Subnet Mask, WCM is 32 bit long.
- a) with WCM, the zero bits indicate that the corresponding bit position must match the same bit position in the IP address.
- b) The one bits indicate that the corresponding bit position doesn't have to match the bit position in the IP address.



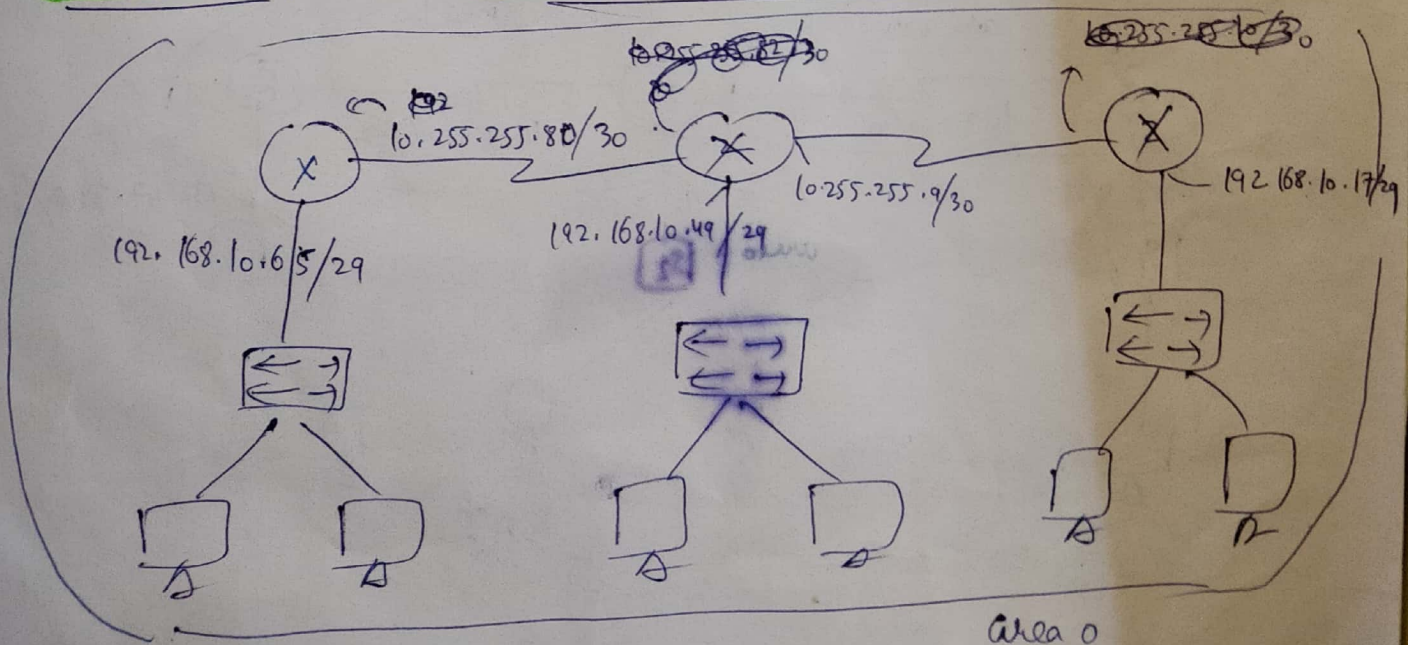
$$10.0.1.0 = 00001010.00000000.00000001.00000000$$

$$0.0.0.255 = 00000000.00000000.00000000.11111111$$

Then zero bits of wild card Mask have to match the same position in the IP address

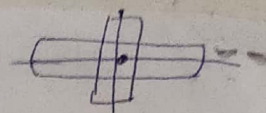
wild card Mask of all zeros (0,0,0,0) means that the entire IP address have to match in order for a statement to execute.

### EXPERIMENT - 1. OSPF USING SINGLE AREA CONCEPT





# router OSPF (1) - Process Id [1-2]  
 # network 192.168.10.65 0.0.0.7 area 0  
 # network 10.255.255.80 0.0.0.3 area 0



### Verifying OSPF configuration

(1) # Show ip route

← Inter area

- ~~Shows~~ shows the found routes for all 12 of area n/w's with 0 representing OSPF internal routes.

NOTE: OSPF uses only bandwidth to determine the best path to a n/w

(2) Show ip OSPF command

- used to display OSPF information for one or all OSPF processes running on the router. like ( Router Id, area info, SPF statistics & LSA timer info )

(3) Show ip OSPF database command

- gives info about the no. of routers in the inter-network  
As plus the neighbouring router's IDs

### Experiment 2 OSPF using Multiple area concept

