

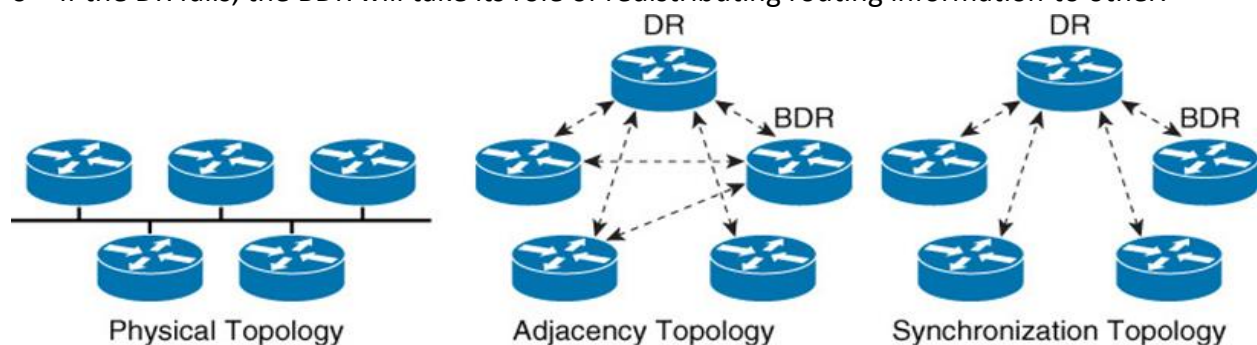
DR (Designated Router) & BDR (Backup Designated Router):

- o Open Shortest Path First (OSPF) uses DR and BDR on each multi-access network.
- o DR & BDR election occurs in multi-access Broadcast & Non-Broadcast network types.
- o DR is the Router in charge to maintain the Open Shortest Path First topology table.
- o DR is the Router in charge to distribute updates to other routers within same segment.
- o When a router is not the Designated Router (DR) or BDR it is called a **DROTHER**.
- o All other routers will form adjacencies only with the elected DR and BDR routers.
- o DR reduce the network traffic between neighbors by providing single source of updates.
- o It is possible to change the priority if you like by using the **ip ospf priority**, command.
- o Default Open Shortest Path First (OSPF) priority is set to one (1) which can be changed.
- o A priority of 0 means the router can never be elected as Designated Router DR or BDR.
- o In Open Shortest Path First (OSPF) use **clear ip ospf process** before change takes effect.

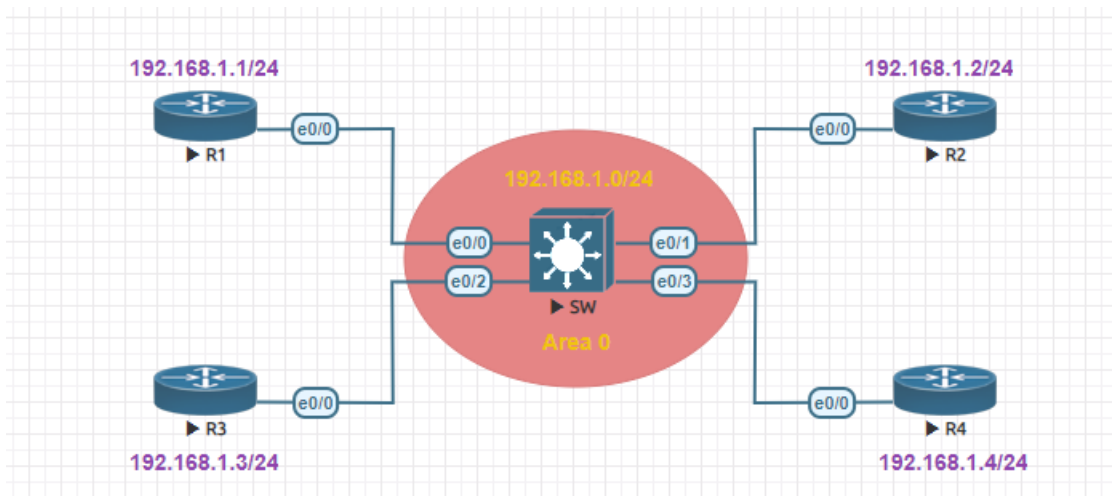
DR and BDR Election:

The default Designated Router (DR) election criteria are as follows:

- o The Router configured with the highest priority wins the election.
- o The default priority is 1 and the possible values range between 0 – 255.
- o If the priority is set to 0, the router will not participate in the DR/BDR election.
- o If the routers configured priority, tie then it uses highest Router ID (RID) as tiebreaker.
- o Router with the second highest priority value becomes the Backup Designated Router.
- o If a router with the higher priority comes online after the election has taken place;
- o It will not become Designated Router (DR) or BDR until DR and BDR router fail.
- o If the DR fails, BDR will take over, another election will take place to elect a new BDR.
- o In Designated Router and Backup Designated Router, Preemption is not supported.
- o First router to come up will be DR and the second will be Backup Designated Router.
- o Each other router will exchange routing information only with the DR and the BDR.
- o DR will then distribute topology information to every other router inside the same area.
- o To send routing information to a DR or BDR, the multicast address of **224.0.0.6** is used.
- o A Designated Router DR sends routing updates to the multicast address of **224.0.0.5**.
- o If the DR fails, the BDR will take its role of redistributing routing information to other.



DR & BDR Lab:



R1 Basic Configuration

```
Router(config)#hostname R1
R1(config)#interface e0/0
R1(config-if)#ip add 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#no cdp run
```

R2 Basic Configuration

```
Router(config)#hostname R2
R2(config)#interface e0/0
R2(config-if)#ip add 192.168.1.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#no cdp run
```

R3 Basic Configuration

```
Router(config)#hostname R3
R3(config)#interface e0/0
R3(config-if)#ip add 192.168.1.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#no cdp run
```

R4 Basic Configuration

```
Router(config)#hostname R4
R4(config)#interface e0/0
R4(config-if)#ip add 192.168.1.4 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#no cdp run
```

R1, R2, R3 and R4 OSPF Configuration

```
R1(config)#router ospf 1
R1(config-router)#network 192.168.1.0 0.0.0.255 area 0
R2(config)#router ospf 1
R2(config-router)#network 192.168.1.0 0.0.0.255 area 0
R3(config)#router ospf 1
R3(config-router)#network 192.168.1.0 0.0.0.255 area 0
R4(config)#router ospf 1
R4(config-router)#network 192.168.1.0 0.0.0.255 area 0
```

Show Commands

```
R1#show ip ospf neighbor
R2#show ip ospf neighbor
R3#show ip ospf neighbor
R4#show ip ospf neighbor
```

R1#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.2	1	2WAY/DROTHER	00:00:31	192.168.1.2	Ethernet0/0
192.168.1.3	1	FULL/BDR	00:00:32	192.168.1.3	Ethernet0/0
192.168.1.4	1	FULL/DR	00:00:34	192.168.1.4	Ethernet0/0

R1#

Make R1 DR

```
R1(config)#interface ethernet 0/0
R1(config-if)#ip ospf priority 200
R1#clear ip ospf process
R2#clear ip ospf process
R3#clear ip ospf process
R4#clear ip ospf process
```

R2#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.1	200	FULL/DR	00:00:32	192.168.1.1	Ethernet0/0
192.168.1.3	1	2WAY/DROTHER	00:00:31	192.168.1.3	Ethernet0/0
192.168.1.4	1	FULL/BDR	00:00:36	192.168.1.4	Ethernet0/0

R2#

R3#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.1	200	FULL/DR	00:00:38	192.168.1.1	Ethernet0/0
192.168.1.2	1	2WAY/DROTHER	00:00:39	192.168.1.2	Ethernet0/0
192.168.1.4	1	FULL/BDR	00:00:33	192.168.1.4	Ethernet0/0

R3#

R4#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.1	200	FULL/DR	00:00:36	192.168.1.1	Ethernet0/0
192.168.1.2	1	FULL/DROTHER	00:00:36	192.168.1.2	Ethernet0/0
192.168.1.3	1	FULL/DROTHER	00:00:35	192.168.1.3	Ethernet0/0

R4#

R1 is Down

```
R1(config)#interface ethernet 0/0
R1(config-if)#shutdown
```

R4 become DR now from BDR state.

R3#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.2	1	FULL/DROTHER	00:00:39	192.168.1.2	Ethernet0/0
192.168.1.4	1	FULL/DR	00:00:38	192.168.1.4	Ethernet0/0

R3#

R1 is UP

```
R1(config)#interface ethernet 0/0
R1(config-if)#no shutdown
```

However, R1 is in DROTHER state no chance to become DR now until clear all routers process.

R3#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.1.1	200	FULL/DROTHER	00:00:37	192.168.1.1	Ethernet0/0
192.168.1.2	1	FULL/DROTHER	00:00:37	192.168.1.2	Ethernet0/0
192.168.1.4	1	FULL/DR	00:00:34	192.168.1.4	Ethernet0/0

R3#