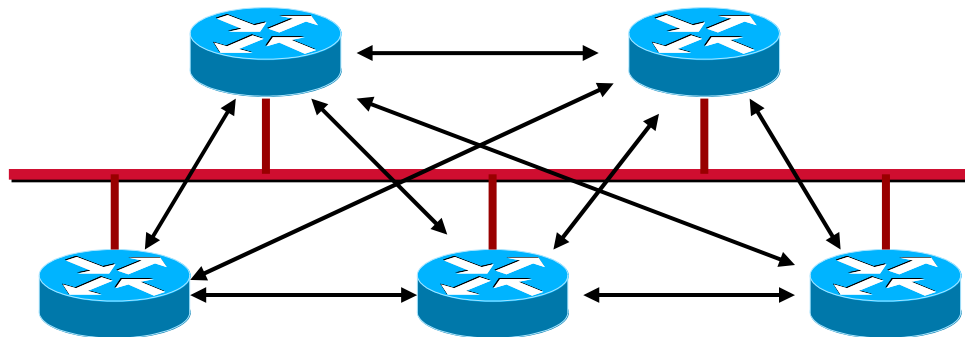# OSPF – Multiaccess Networks

The IETF Routing Master
Part 3

Broadcast Multi-Access Media (1)

- **When several OSPF routers have access to the same Ethernet segment they would create** **n(n-1)/2** **adjacencies**

- **Furthermore, SPF algorithm requires to represent a fully meshed network as** **tree**

Broadcast Multi-Access Media (2)

- **Solution: Elect one "Designated Router" (DR) to represent the whole LAN segment**
  - **Election uses the Hello protocol**
- **DR sends Network LSA**
  - **List of all local routers**
  - **Ensures that every router on the link has the same topology database**
  - **Also contains subnet mask (!)**
- **Each other router establishes an adjacency only to the DR**
  - **Using "All DR" multicast address 224.0.0.6**

DR
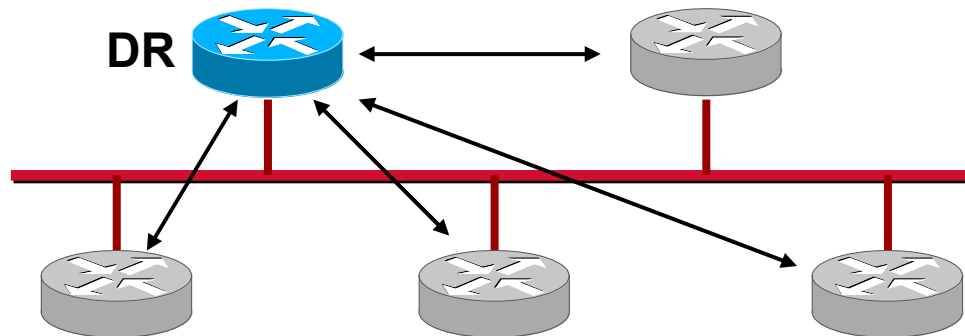
Broadcast Multi-Access Media (3)

- **Only the DR will send LSAs to the rest of the network**

- **For backup purposes also a Backup DR is elected (BDR)**
  - ◆ **All routers also establish adjacencies to the BDR**
  - ◆ **BDR itself also establishes adjacency to DR**
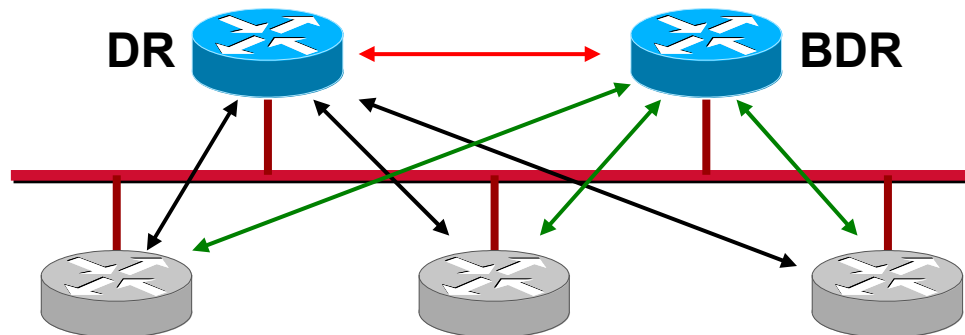
Router ID

- **Each router is a node in the graph (link state database) and identified by a Router ID**

- **Automatically selected via hello process**
  - ◆ **Choose numerically highest IP address of all loopback interfaces**
  - ◆ **If no loopback interfaces then choose highest IP address of physical interfaces**
  - ◆ **Optionally, on Cisco routers, a priority value can be configured (0…no DR/BDR, 255…max chance to win, 1… default)**
  - ◆ **Hello packet contains DR**

DR/BDR Election Process

- **Election process starts if no DR/BDR listed in the hello packets during the init state (i. e. when two routers begin to establish an adjacency)**
  - ◆ **Note: if already one DR/BDR chosen, any new router in the LAN would not change anything!**
  - ◆ **Therefore, the power-on order of routers is critical !!!**
- **Always configure loopback interface in order to "name" your routers**
  - ◆ **Loopback interface never goes down**
  - ◆ **Ensures stability**
  - ◆ **Simple to manage**