Politecnico di Torino

Protocolli e Architetture di Routing

Capture and analysis of OSPF packets (multi area)

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Introduction

Given the router network pictured below, configure the devices with IPv4 addressing rules using the **192.168.8.0/21** address block.

Configure the network to use the OSPF protocol with **multiple areas**, using the area identifiers as shown in the figure. Please remember that area **0** is the **backbone**: you can assume that there are no hosts (in addition to the routers) connected to the `LAN0`.

Verify that routes are correctly propagated and that all the destinations can be reached (e.g., using PING sessions).

Note: remember to configure the point-to-point Ethernet links in **point-to-point** mode, using the `ip ospf network point-to-point` command on the proper Ethernet interfaces.
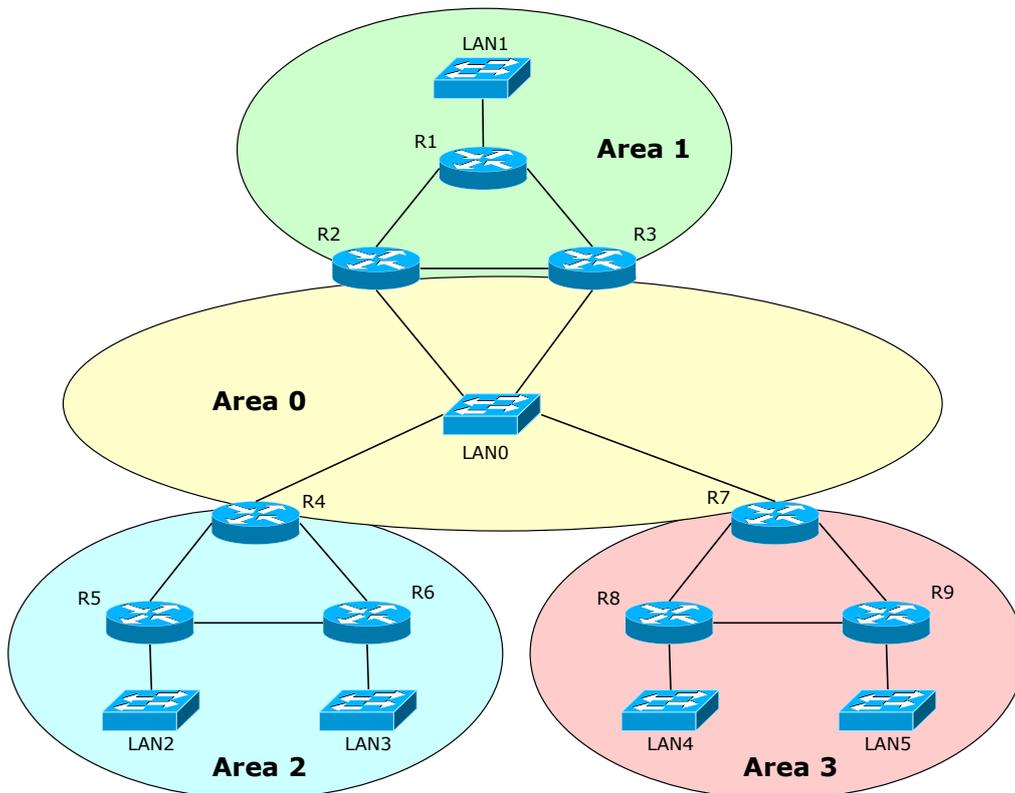
Lab questions

1. Provide an image of the **addressing plan** used in the network, including the addresses of all the router interfaces and IP networks. List also the *loopback* addresses, if any, assigned to the routers.

   Please reserve properly sized address ranges for each LAN.

2. Let the network reach a steady state, then reset the OSPF process on `R1` using the command:

   ```
   # clear ip ospf process
   ```

Capture the packets flowing on the links `R1` – `R2` and `R1` – `R3`. Depending on the precise instant in which `R2` and `R3` send their messages, the most interesting packets might be sent on one link or on the other.

3. Using the information from the previous capture, describe the *Bring-Up Adjacencies* algorithm. Describe the **general meaning** of each interesting field of the packets sent during the algorithm execution and provide the **values** that those field had in the previous capture.

4. Provide the OSPF database as shown, in steady state, on `R1`, by using:

   `# show ip ospf database`

   with a brief description of each field and record, for all the sections printed on screen. Why the networks under *Summary Net Link States* are listed twice?

5. Execute the proper commands on router `R2` that allow to observe the OSPF database from that point of view[1]. Based on those information, draw the view of the network from that router, showing which destinations are seen, and how, by `R2`.

   Notes:

   - you may have to draw more than one topology starting from router `R2`;
   - use the notation that represents IP networks as "clouds", as presented in class.

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[1]The command `show ip ospf database` may not be enough to get all the information required. Students are invited to look at the Cisco documentation and find the appropriate command.