

DR and BDR Elections (Instructor Version)

Instructor Note: Red font color or Gray highlights indicate text that appears in the instructor copy only.

Objectives

Modify the OSPF interface priority to influence the Designated Router (DR) and Backup Designated Router (BDR) election.

The purpose of this activity is to simulate how designated and backup designated routers are selected for an OSPF area.

Scenario

You are trying to decide how to influence the selection of the designated router and backup designated router for your OSPF network. This activity simulates that process.

Three separate designated-router election scenarios will be presented. The focus is on electing a DR and BDR for your group. Refer to the PDF for this activity for the remaining instructions.

If additional time is available, two groups can be combined to simulate DR and BDR elections.

Required Resources

- Router priorities paper sign example (student developed)
- Router ID paper sign example (student developed)

Directions

This is a group activity with four classmates comprising each group. Before reporting to the group, each student will prepare router priority and router ID signs to bring to the group.

Step 1: Decide the router priority.

- a. Prior to joining your group, use a clean sheet of paper. On one side of the paper, write DEFAULT ROUTER PRIORITY = 1.
- b. On the other side of the same sheet of paper, write ROUTER PRIORITY = (choose a number between 0 and 255).

Step 2: Decide the router ID.

- a. On a second clean sheet of paper, on one side, write ROUTER ID = (any IPv4 number).
- b. On the other side, write ROUTER ID = Loopback (any IPv4) number.

Step 3: Begin DR and BDR elections.

- a. Start the first election process.
 - 1) Students within the group will show each other the router priority numbers they selected for Step 1b.
 - 2) After comparing their priority numbers, the student with the highest priority number is elected the DR and the student with the second-highest priority number is elected the BDR. Any student, who wrote 0 as their priority number, cannot participate in the election.

- 3) The elected DR student will announce the elections by saying “I am the DR for all of you in this group. Please send me any changes to your networks or interfaces to IP address 224.0.0.6. I will then forward those changes to all of you at IP address 224.0.0.5. Stay tuned for future updates.”
 - 4) The BDR's elected student will say, “I am your BDR. Please send all changes to your router interfaces or networks to the DR. If the DR does not announce your changes, I will step in and do that from that point onward.”
- b. Start the second election process.
- 1) Students will hold up their DEFAULT ROUTER PRIORITY = 1 sign first. When it is agreed that all of the students have the same router priority, they will put that paper down.
 - 2) Next, students will display their ROUTER ID = Loopback (IPv4) address signs.
 - 3) The student with the highest loopback IPv4 address wins the election and repeats “I am the DR for all of you in this group. Our priorities are the same, but I have the highest loopback address on my router as compared to all of you; therefore, you have elected me as your DR. Please send all changes to your network addresses or interfaces to 224.0.0.6. I will then report any changes to all of you via 224.0.0.5.”
 - 4) The BDR will repeat his/her respective phrase from Step 3a,4).
- c. Start the third election process, but this time, all students can choose which sides of their papers to display. The DR/BDR election process uses the highest router priority first, highest loopback router ID second, and highest IPv4 router ID third, and elects a DR and BDR.
- 1) Elect a DR and BDR.
 - 2) Justify your elections.
 - 3) If you have time, get together with another group and go through the scenario processes again to solidify DR and BDR elections.

Identify elements of the model that map to IT-related content:

- Designated router
- Backup designated router
- Multicast 224.0.0.6
- Multicast 224.0.0.5