OSPF Lab
Understanding areas

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In this lab you will configure OSPF-areas.

- If you get stuck somewhere, a good place to begin searching for a potential solution is in the "OSPF Design Guide".
- Make sure you save your router configuration to a local file regularly as a backup.

To figure out what Area ID you have been assigned: Take the last two letters of the router ID. Let the letter A map to 1, B map to 2, etc. Thus RTA1 → area 11, RTC2 → area 32, RTE4 → area 54 etc.

1 Configure an Area

In this section you will configure two areas- your own area and the backbone area (0). Your personal area should consist of the four "/29" networks you configured in previous lab (`e0, lo0, lo1, lo2, lo3`). Tie these four networks into OSPF, but under your own Area ID. Let the rest of the router's interfaces remain members of the backbone area (Area 0)

Checklist:

- Verify that the loopbacks are up and running, and that you can ping all networks in your topology handout.
- Study the link state database. Do you see anything new? Look at the details in the database and try to figure out how everything works.
- Why are OSPF areas used at all? What function do they play?

2 Route aggregation

Currently your router advertises four nets from your area. In this section, your job is to aggregate the four nets into one larger net.

Checklist:

- Verify that your routing table looks correct; i.e. make sure that the networks which are directly connected to you are visible.
- Take a look at your link state database. Has it changed? How has it changed?
- On the internet, it is considered good practice to aggregate nets when possible. Why?

3 Preparing for Stub Areas

In this section you will configure your router in preparation for the next section. Note: from this section on you must work together with another router - You will be working in pairs; RTX1 with RTX4, and RTX2 with RTX3. For the rest of this lab, the term "group" refers to a pair of routers.

In your group, reconfigure your two routers so that:

1. They both belong to the same area.
2. One router is configured as an Area Border Router (ABR).
3. One router is configured as an internal router.

Inject two external routes into area 0 in your ABR. The two routes should point to the null interface (`null0`). Use static routing to inject the routes. The two prefixes should be 192.168.(100 + *areanumber*).0/24 and 192.168.(200 + *areanumber*).0/24, For example:

RTA1: 192.168.111.0/24 and 192.168.211.0/24.
RTC2: 192.168.132.0/24 and 192.168.232.0/24.
RTD1: 192.168.141.0/24 and 192.168.241.0/24.
RTE4: 192.168.154.0/24 and 192.168.254.0/24.
etc...

Checklist:

- Verify that the external routes have been properly inserted into the routing table.
- Take a look at your link state database- do you see anything new?
- Verify that the routing table contains external linkstates.
- What type of external routes are they? What does it mean?
- What is the difference between a Stub area and a normal area? How can external routes show the difference between the two types of areas?

4 Stub area

Transform your area into a Stub area.

Checklist:

- Must you configure both the ABR and the internal router to set your area as a Stub Area?
- Verify that the ABR's conception of the world differs from the internal router's conception.
- Why are the two router's conception of the world different?
- Has the ABR's database changed since the last section (Section 3)? If so, how is it different?
- Has the internal router's database changed since the last section (Section 3)? If so, how is it different?

5 Totally Stub area

Transform your area into a Totally Stub area.

Checklist:

- What is the difference between a Stub area and a Totally Stub area?
- How does the routing table differ from the last section (Section 4)? Has any information been removed or added?
- How do the tables in the ABR and the internal router differ?