Middle East Technical University

Department of Computer Engineering

CENG 435

Data Communications and Networking
Fall 2025–2026
Assignment 2

Due date: 2025-12-01 23:59

1 Introduction

For this assignment, you will follow the IPv4 Network Configurator Tutorial on the OmNeT++ framework. Like the previous assignment, pair off into groups of two to complete this assignment. You have two options for your submission: You can either **(1)** prepare a report that answers each question in detail with supporting figures or **(2)** prepare a video, quickly going over each resulting network while describing them. You can show off the animations.

2 Tasks

Complete each task by following the descriptions. After you are done with the steps, you will have a configured Network. Either **(1)** describe this Network by attaching figures and relevant source files or **(2)** show this Network and briefly explain it in your video.

2.1 Task 1

Follow the tutorial page given in Step 1. The IP addresses are assigned automatically for this network. So, even though you can run the simulation, there will not be any events generated. Observe how the IP addresses for the hosts and routers are assigned, and for the routers, each interface has a different IP address. Also see that switches do not have an IP address. Then, refer to Major IP Address Blocks For Turkey, METU's IP block is `144.122.0.0/16`. Edit `omnetpp.ini`'s `[Config Step1]` to assign METU's IP block for this network rather than the default `10.0.0.0/8`

2.2 Task 2

Follow the tutorial page given in Step 2. Then, edit `[Config Step2]` and place the IP addresses of `ceng.metu.edu.tr`, `ii.metu.edu.tr` and `bidb.metu.edu.tr` on the network, after discovering those hostnames IP addresses yourself.

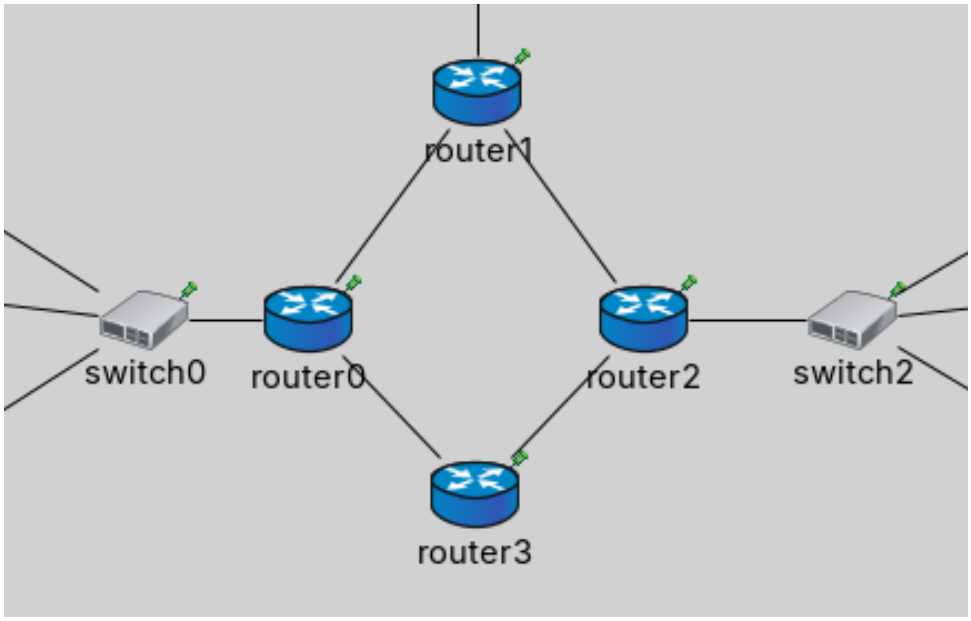

Figure 1: Adding the 4th router for Step 5.

2.3 Task 3

Follow the tutorial page given in Step 3. Make sure to study `step3alt1.xml` and `step3alt2.xml` files. Then, place the *mera*, *ismailabi* and *digital* labs from our department on the network. Do not add additional hosts, routers or switches, just configure the network so that the available hosts are assigned sane IP addresses.

mera inek1 (144.122.238.21) - inek39 (144.122.238.59)

ismailabi inek40 (144.122.238.60) - inek64 (144.122.238.84)

digital inek65 (144.122.238.85) - inek100 (144.122.238.120)

2.4 Task 4

Follow the tutorial page given in Step 4. Like with Section 2.3, convert this network to resemble the department computers, then observe how the routing tables change.

2.5 Task 5

Follow the tutorial page given in Step 5. After understanding how to manually alter the routing table for individual hosts and subnets, add a 4th router in a diamond configuration (Figure 1). Then, modify the network such that pings coming from `host0` are routed through `router1` and the replies are routed through `router3`.

2.6 Task 6

Follow the tutorial page given in Step 7 (not 6!). Build on `step7c.xml`, create three areas: `144.122.71.0/24`, `144.122.238.0/24`, and `144.122.233.0/24`. Use hierarchical and optimized routing to create the most minimal routing table.

3 Specifications

- Feel free to ask questions through ODTUClass Student Forum. I'm also available on yigit@ceng.metu.edu.tr. Please be patient with the questions between the 9th of November to 17th of November.
- See the course syllabus for the late submission policy.
- If you choose to submit a video, upload it to YouTube unlisted and submit the link to the assignment submission. Mention the students for the assignment both verbally and in the video description. You can delete the video after the assignment grades are announced.
- If you choose to submit a report, upload it to the ODTUClass *Report Submission*. Only one submission per group.

3.1 Grading

- Each task is 15 points.
- The structure, quality and neatness of your report or the presentation of your video is worth 10 points.