

## Individual Project. Network diagnostic utility in C/C++

The project involves developing a network utility, in the C/C++ programming language. The project requires implementing the core functionality of the utility, which allows testing intermediate nodes availability on the network path from the client's machine to any chosen FQDN. The diagnostic method should be chosen and justified by each student individually.

### Project Requirements:

#### Mandatory Requirements (Must-have)

- Should be written in C/C++
- Target OS - Linux
- Creation of a RAW sockets
- Route display
  - Print the IP address of each intermediate hop.
- Hop count limitation
  - Implement a maximum number of hops (MAX\_HOPS) to prevent infinite loops.
- Utility should discover and display domain name of each intermediate network node (if available).
- User-friendly text-based output
- Integration with OpenWrt
  - Compile the program as part of an OpenWrt build.
  - Run it on a virtual machine for testing.
- The history of development should be available on git.

#### Desirable Requirements (Nice-to-have)

- Round Trip Time (RTT) measurement
  - Measure the time taken for each hop to respond.
- Error handling
  - Provide detailed error messages for socket creation, packet sending, and receiving failures.
- Network interface selection
  - Allow specifying the network interface for sending packets.
- FQDN, network interface and other options should be implemented as CLI arguments.

- Commits should be meaningful and atomic with proper messages.

## Expected results

The expected result of the project is a fully functional Linux utility that accurately traces the route of packets from a source to a destination node across the network. It should display each hop along the way, showing the time taken for each segment of the route. The utility should work efficiently on Linux, correctly handling network protocols and socket communication with proper and verbose error handling.

## How to submit a project for review

You will present your project individually to the whole group and the mentor in an offline session. Be prepared to demonstrate your work, explain your reasoning, and answer questions about the implementation. Please note that Delivery Managers may also attend the presentation session.



The time limit to complete the project is 4 weeks



Mentors will conduct the group Q&A session on February 27



The project submission will take place offline at the GlobalLogic office in Lviv On March 25

Feel free to contact us via Slack or to [pre-hire.education@globallogic.com](mailto:pre-hire.education@globallogic.com).