



## An auto-grading framework for the mini-Internet project

Semester thesis proposal

One practical group project in our communication networks lecture is the routing project [1]. For this project, we build a virtual mini-Internet infrastructure composed of hundreds of routers and dozens of Autonomous Systems (ASes) in one of our server and let the students configure their ASes and virtual devices. They have to configure various routing protocols to enable Internet-wide connectivity, for instance OSPF to enable intra-domain connectivity and BGP to enable connectivity between different ASes. Motivated by the positive feedback we received from the students following our lecture, we decided to make the platform publicly available [2,3]. Several universities and companies have already started to use the platform. As a result, we plan to add new features and improve the existing code.

In this thesis, the goal is to implement an auto-grading framework that the teaching assistants can use to grade the students. Grading the students requires the entire TA team to devote hours of work to look at the config and verify that routing policies are correctly configured. An auto-grading framework could help TA team speeding up the grade process as well as making it more accurate. Besides, some parts of the framework could also be used by the students during the project to help them detecting errors and misconfigurations. The student is expected to find how to accurately grade the students, for instance by parsing the configuration files directly, or looking at the routing information (*e.g.*, looking glasses) or even by performing actual data plane measurements (*e.g.*, traceroutes) to make sure that the traffic follows the correct paths.

If you want to help us to further develop the mini-Internet platform, we would be happy to talk with you and see which direction we could take based on your preference and skills.

**Prerequisites:** This thesis requires developing in Bash and being familiar with UNIX tools. Before contacting us, please take a look at the implementation of the mini-Internet [2] and see whether you feel like you can help us extending the platform.

In addition, the following skills are required.

- Basic knowledge of virtualization/containerization (*e.g.*, Docker);
- Communication Networks (227-0120-00L), or equivalents.

### Contact

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## References

- [1] ETH Zurich, Communication Networks course, 2020. <https://comm-net.ethz.ch/>.
- [2] Mini-Internet at ETH Zurich. <http://mini-inter.net>.
- [3] T. Holterbach, T. Bühler, T. Rellstab, and L. Vanbever. An Open Platform to Teach How the Internet Practically Works. *SIGCOMM Comput. Commun. Rev.*, 2020.