



Take the mini-Internet to the next level

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 [2,6]. 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.

One of the feature we would like to add is the Resource Public Key Infrastructure (RPKI). RPKI started to be developed in 2008 and aims at preventing BGP hijacks [4]. Since 2011, it has been more and more deployed within the Internet [5, 7]. Given the high interest of the network community, we decided to implement the RPKI infrastructure within the mini-Internet. The goal of this thesis is to continue the work done during a previous semester thesis [3]. More precisely, the student is expected to improve how the RPKI infrastructure is implemented to better reflect the actual implementation in the real Internet. The student is also expected to implement a web-interface so that students can graphically issue and manipulate Route Origin Authorisations (ROAs).

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

- Being able to program in Bash or Python, good knowledge in UNIX-like systems;
- Basic knowledge of virtualization/containerization (e.g., Docker);
- Basic knowledge in cryptography and/or network security (for the RPKI proposal);
- Communication Networks (227-0120-00L), or equivalents.

Contact

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References

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