

Thesis
B.Sc.

Thesis
M.Sc.

IDP

Rust-based MASQUE-Proxying for Lower OSI- Layer Protocol Traffic

Motivation

Existing proxying technology comes with drawbacks. SOCKS is unencrypted and HTTP CONNECT is currently limited to proxying of TCP data. The MASQUE working group of IETF [1] plans to extend the current HTTP CONNECT with capabilities for proxying UDP and even IP-layer traffic. They focus on HTTP/3 which runs on top of the new transport protocol QUIC, which offers improved performance, embedded security and multiplexing. This technology has already attracted the attention of research [2], but is still relatively unknown and has especially seen only very few implementations. Its biggest use case is Apple's iCloud Private Relay [3], their code is however closed source. The main goal of this thesis is now to use one of the existing, Rust based QUIC/HTTP3-libraries ([4] or others) and extend them with the functionality UDP and IP-layer data proxying.



Your Task

- Familiarize yourself with QUIC, MASQUE RFCs and drafts and your chosen implementation
- Implement support for lower-layer proxying in it
- Test and benchmark your implementation

References

- [1] <https://datatracker.ietf.org/wg/masque/about/>
[2] <https://dl.acm.org/doi/10.1145/3488660.3493806>
[3] https://www.apple.com/icloud/docs/iCloud_Private_Relay_Overview_Dec2021.pdf
[4] <https://github.com/cloudflare/quiche>

Requirements

Good programming skills in Rust (or willingness to acquire them), familiarity with GNU/Linux and network protocols.

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