

Thesis
B.Sc.

Thesis
M.Sc.

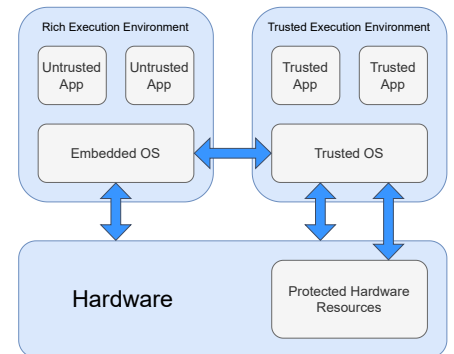
IDP

Impact of a TEE on QUIC Performance

Motivation

The transport protocol QUIC aims to provide secure, fast, and reliable connections. QUIC was standardized by the Internet Engineering Task Force (IETF) in 2021. It is based on UDP and uses TLS 1.3 for encryption. [1]

Trusted execution environments (TEEs) are secure and isolated execution environments. They are used to protect sensitive data and code against attacks malicious and untrusted software running on the same system. With AMD Secure Encrypted Virtualization (SEV) or Intel Trust Domain Extensions (TDX), it is possible to run containers in a TEE. [2] When running a QUIC server in a TEE, the isolation helps against common security vulnerabilities like buffer overflows and privilege escalation attacks by reducing the attack surface. However, the isolation also introduces overheads, which may impact the performance of QUIC.



Goal

The goal of this thesis is to extend an existing QUIC performance evaluation framework [4] to support execution in a TEE. With a working implementation, measurements should be executed to evaluate the performance of QUIC in a TEE in detail.

Your Tasks

- Familiarize yourself with the topics (QUIC, trusted execution environments)
- Perform a baseline evaluation of Kata Containers [3]
- Extend the QUIC Interop Runner to be able to run QUIC in a TEE
- Evaluate the performance of QUIC in a TEE

References

- [1] <https://www.rfc-editor.org/rfc/rfc9000>
- [2] <https://www.amd.com/en/developer/sev.html>
- [3] <https://katacontainers.io/>
- [4] Jaeger et al., "QUIC on the Highway: Evaluating Performance on High-rate Links", IFIP Networking 2023.

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