TU Clausthal

Abschlussvortrag Research Track

Freitag, den 11.02.2022, 11:00 Uhr,
https://webconf.tu-clausthal.de/b/umu-2ey-ekt

Sven Friedrich

"Symmetric Multiprocessing for L4Re on ARM Architecture using RUST"

Embedded systems have long been evolving towards incorporating more than one processor. We see both homogeneous and heterogeneous multicore designs. Symmetric Multiprocessing (SMP) is enabling high-performance embedded computing for applications that required more processing power for their workload. However, parallel programming of multicore embedded applications suffers from complexity. It is notably harder, time-consuming, and most important of all, error-prone than sequential programming which makes it a challenge particularly in safety-critical domains. In avionics, the position paper CAST-32A Multi-core Processing reports the concerns and proposes objectives regarding the safety of multicore software. The key is identifying and preventing possible interferences that may hurt determinism. Rust is an open-source systems programming language that aims at amongst others being safe. In this work, we investigate how Rust can help in developing safe multicore applications, particularly in the avionics domain. A representative platform is designed with a partitioned runtime environment using L4RE separation kernel on multicore ARM architecture. The evaluation is carried out using a parallel implementation of a forward-looking terrain avoidance algorithm.

Gutachter: apl. Prof. Dr. Umut Durak und Prof. Dr. Sven Hartmann

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