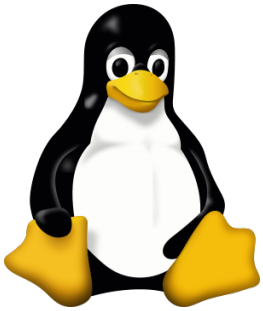
Informatik 11
Embedded Software

RWTH AACHEN UNIVERSITY

Thesis (MA/BA)

Latency Minimization in Distributed Real-Time Systems through Linux Kernel Bypass Techniques

DDS (Data Distribution Service) is a popular middleware technology for distributed systems in the automotive and robotics fields. It provides a standardized and efficient approach to data sharing and communication among various components in a distributed environment.



Minimal and predictable communication latencies are crucial in real-time and safety-critical systems. The goal of this thesis is to adapt an existing DDS implementation to use AF_XDP to minimize communication latencies. AF_XDP is a Linux kernel bypass technique that enables direct transfer of network packets from the network adapter to application memory, without traversing the network stack of the Linux kernel. This technique has significant potential for reducing communication latencies.

Your tasks in this thesis will include:

- Analyzing the current DDS implementation and identifying areas for latency optimization
- Investigating AF_XDP and its applicability within the context of the DDS implementation
- Designing and implementing the extension to integrate AF_XDP into the DDS implementation
- Conducting extensive testing and performance measurements to evaluate the impact of AF_XDP integration on latency
- Documenting the work performed and summarizing the achieved results
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Requirements:

- Knowledge of software development and distributed systems
- Familiarity with network protocols and communication technologies
- Proficiency in C++
- Interest in real-time systems

Contact

Please read our Instructions for Applications.

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