TECHNISCHE UNIVERSITÄT DRESDEN

Faculty of Computer Science Institute of Systems Architecture, Chair of Operating Systems

Task for the preparation of a Bachelor Thesis

Course:	Informatik (Bachelor)
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Title:	Fuzzing Framework for RDMA-networks

Remote Direct Memory Access (RDMA) networks offer significant performance benefits by exposing the device directly to the user application. On the one hand RDMA-networks remove the operating system from the critical path of communication. On the other hand, the interface from the application to the OS and from the application to the device becomes significantly more complicated. In comparison to traditional sockets-based API, such design increases the attack surface of the OS and the underlying network infrastructure.

With the increasing adoption of RDMA-networks in cloud settings, the attacker models consider user applications to be potentially malicious. Therefore, the interface between the application and the RDMA-network must be secure. The existing works have already shown fundamental problems in state-of-the art RDMA network architectures, but have not yet studied the safety of the API itself. The goal of this work is to characterise the attack surface created by the RDMA communication API.

The goal of this project is to characterise possible attack vectors coming through the RDMA API. Furthermore, the project must propose measures to harden the attack surface. A promising approach for hardening RDMA API is to apply fuzzing techniques aimed to find potential vulnerabilities in existing kernel-level RDMA-infrastructure. If such direction is chosen, the student shall design a fuzzing infrastructure targeting RDMA devices or RDMA device drivers. As such, the fuzzing infrastructure may rely on specifics of RDMA-network architectures to make bug-finding more efficient.

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