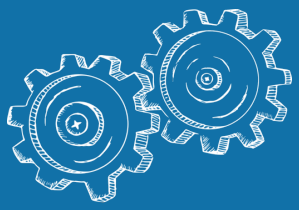


Kernel Taint Tracking

Advisor: **Lukas Maar**

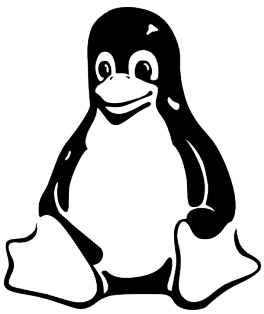
Motivation

Taint tracking in the Linux kernel is a mechanism that can be used to track the flow of untrusted or potentially harmful user data. It serves a dual purpose in cybersecurity: defense and offense. Defensively [2], it carefully monitors user data flow to protect the kernel from threats. On the other hand, attackers [1] find it valuable as it reveals potential objects that can be used for kernel exploitation. This makes taint tracking a key factor in modern kernel security.

This project will further investigate the possibility of using a static analyzer for taint tracking within the Linux kernel. Recognizing the capability of the LLVM compiler as a framework for such analysis, we intend to develop a proof-of-concept. This LLVM-based approach aims to automatically analyze the kernel, unveiling the flow of untrusted or potentially harmful user data.

Goals and Tasks

- Get familiar with the Linux kernel's and LLVM compiler's infrastructure
- Develop a compiler pass that performs taint tracking in the Linux kernel
- Demonstrate and evaluate the implementation



Literature

- Z. Lin et al.
  GREBE: Unveiling Exploitation Potential for Linux Kernel Bugs
  S&P
- R. Wang et al.
  AlphaEXP: An Expert System for Identifying Security-Sensitive Kernel Objects
  USENIX Security

Courses & Deliverables

- ☑ **Introduction to Scientific Working**
  Short report on background
  Short presentation
- ☑ **Bachelor Project**
  Project code and documentation
- ☑ **Bachelor's Thesis**
  Project code
  Thesis
  Final presentation

Recommended if you're studying

☑ CS ☑ ICE ☑ SEM

Prerequisites

- Programming: C/C++
- Interest in the Linux kernel
- Interest in compiler technology and system security

Advisor Contact

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