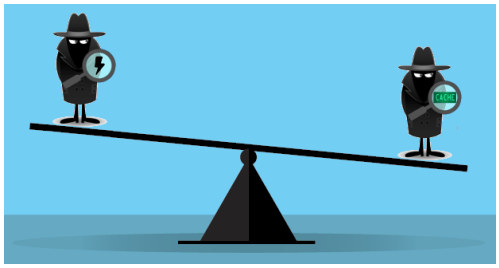
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

TIK
Institut für Technische Informatik
und Kommunikationsnetze
Computer Engineering and
Networks Laboratory

Prof. L. Thiele

Master Thesis:

How bad is that security leak?



Today's Laptops, Servers and mobile devices (smartphones, tablets, ...) are often used for sensitive applications (bank, health, ...) as well as non-sensitive applications (games) or are even shared among multiple users at the same time.

While various sandboxing and segregation techniques exist to ensure the security of sensitive application and information, the applications still share the system. The coexistence on the same system allows the leak information, for example through covert channels. In recent time, covert channels have been a very popular research topic, but the classification of their threat potential and a comparison of different covert channels are still very hard. In this thesis, we will try to establish a framework which allows researchers and application developers to easily exploit and benchmark covert channels in their systems, to make covert channels comparable and allow an easy classification of the threat potential.

Tasks

The student will extend our work on the evaluation of covert channels. It mainly focuses on covert channels which are established through physical characteristics of the CPU cores. The main tasks to complete the thesis will be:

- Get to know and polish the existing measurment framework for open sourcing
- Implement a known covert channel and add a new suiting target device to the framework
- Apply existing methodology to find capacity bounds for all implemented covert channel
- Build and execute a case study to evaluate the channels achievable maximum capacity and the robustness under laboratory conditions on different target devices.
- Implement and run real attacks with all covert channels on different target devices.
- Compare all examined covert channels and classify their threat potential.

Requirements / Skills

- Knowledge in ...
  - Application development (C / C++ / Java development or similar)
  - Data Analysis (MATLAB, Python or similar)
  - UNIX Shell or similar System Programming (Script Languages)
  - System Security, Signal Processing, Classification, Neural Networks
- Curiosity and interest in security and in systems research

Interested? Please have a look at http://www.tec.ethz.ch/research.html and contact us for more details!

Contacts

- Philipp Miedl: philipp.miedl@tik.ee.ethz.ch, ETZ G76