

Applied Research in Firmware security of embedded devices

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November 30th 2020

Module: SEAR

Venlo, Limburg, Netherlands

Abstract

- Complete, but very succinct summary of the paper
- Half a page long
- Short description of research(brief statements of the purpose, methods, results and conclusions)

Contents

1	Introduction	1
2	Methods	1
3	Results	2
4	Discussion	2

List of Figures

1 Introduction

The research we are conducting is about firmware security mainly but we will touch on the topic of embedded devices also because the two work together. In general, most devices with firmware are relatively easy to reverse engineer by hackers who want to find vulnerabilities that they can exploit to attack different parts of the software eco-system. Therefore the goal of this research is to find a way to increase firmware security. In recent years embedded devices have become very popular in many countries worldwide, they are often used in households, factories, and even in infrastructure objects. Their usage is predicted to increase steadily in the next decades. The firmware used in all embedded devices is basically computer software that is meant to work with specific hardware in order to execute one or a few very concrete functions. The Firmware is not as secure as we would like it to be, there are many ways of hacking (breaching) it so that one (the hacker) can find how exactly it operates and if there are any holes that can be exploited for benefit or used to harm either the users or the creators of the firmware. Even though there are many ways of hacking an embedded device, the focus of this research paper is mainly on reverse engineering and a few other methods of hacking may be mentioned. That is the process by which an artificial object is deconstructed to reveal its designs, architecture, code or to extract knowledge from the object.

- Provide the reader with everything they need to know to understand what you are doing and why
- Length: max 3 pages
- Theoretical background (literature review)
- Why the work is important
- Specific research question
- (if applicable) Hypothesis to be tested
- Divide into subsections

2 Methods

- How you performed the experiment / interview / survey or how you set up your comparative analysis
- Length: min. 2 pages
- Methodology (Research strategy, material, planning): which method you used, why, how it was carried out
- NO results or interpretation in this section!

We should primarily focus on experiments and research papers as material. Because these two sources give us a deep understanding of the underlying structure and the causes of the problem. Every paper you read should be logged on one of the following pages. To prove our research we maybe provide interviews.

3 Results

- Share the data you found
- Length: min. 2 pages
- Describe the results (do NOT add your interpretation/analysis)
- Graphs, figures and tables that show your data belong in this section. Describe the graphs and explain what the reader is seeing

4 Discussion

- Interpret the results from the previous section
- Answer your research question/s and explain if your hypothesis was proven right or not: Refer to starting point (objective research question)
- Length: max. 4 pages
- Evaluate process (Reflection: how did it go)
- Further research (how your research could be improved, what else could be done)