



Research security smart home devices

Project Plan

Bachelor Electronics-ICT CCS

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PREFACE

For our internship in the third year for Thomas More, we (Sander and Joey) made this document as a Project plan.

We had several projects to choose from but found this project to be the most interesting.

We chose Halmstad university because of multiple reasons: The university is in Sweden, where the work environment and culture are different compared to Belgium. The task itself is an academic task and not a normal working task (writing a research paper instead of working on a practical project).

First, we like to thank Thomas More for making this internship possible. Next, we would like to thank Torben Svane for taking diligent care of us in Sweden and Belgium and guide us through our internship. We also like to thank Nathalie Bosschaerts for guiding us through our internship. And finally, we would like to thank Tinne Van Echelpoel because she made it possible for us to go to Sweden.

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1 INTRODUCTION

As mentioned in the preface we had several choices for our project. We chose for writing a research paper about the security of smart home devices.

In the next pages, we will briefly describe the problem definition, as well as the project description, the goals we pursue, project-planning and a conclusion.

First, in the problem definition, we will describe the relevance of our project by stating the reason why we do it, who the stakeholders and partners are and the situation at the moment of the start of the project.

Next, in project-description, we will summarise what our project is about. In goals, we will outline the different targets/goals for our project. Then in the planning, we will give an outline of our project planning and in conclusion, there will be a quick summary of the most relevant parts of this document.

2 PROBLEM DEFINITION

With the rapid adoption of "smart" technologies in households – and possibly, with limited insight about device vulnerability – many households may be increasing their security risk when buying "smart" devices, rather than the opposite. Several studies have addressed the (missing) level of data protection and exposure to external device manipulation through simple means.

Exploring such issues are useful for students in the field. Reporting on the results will likewise be beneficial, for our professional skills, but also for making the public aware of some of the possible risks introduced, from what generally is seen as devices aimed at improving security.

The partners of this research project are Halmstad University and Thomas More Kempen. The stakeholders are the ones who need this research paper for their educational purposes as well as for companies to improve their safety on the devices itself. We started here from scratch, we had to research all this and expand our knowledge.

3 PROJECT DESCRIPTION

We were asked to write a paper about the security of smart home devices because they are working on network forensics lab at the university and this paper will be a part of this. This project would be for educational purposes. We were also told that the paper may be published so that everyone can use it for his or her research.

In this document both the general security and the data coming from the device will be checked. Here we will see whether sensitive data of the user can be viewed and is sent unencrypted. We will do this with the tools we have seen in the lessons of cybersecurity and also with tools that we have researched.

Due to the current restrictions of worldwide movements(Covid-19), we will have to conduct our experiments at home (in Belgium).

4 GOALS

The project would be research about the security of smart home devices. We need to write a paper with vulnerabilities we can find on some devices. The devices we are going to talk about are a Bose speaker, a Google Home speaker, a Google Chromecast, a router, a Nvidia Shield, a smart light and a smart tv. We will test those vulnerabilities on the devices themselves and find some solutions for the vulnerabilities. We will write the results in the paper.

We will choose 3-4 "smart" devices, commonly available in the marketplace and perform experiments to explore these devices' proneness to external manipulation. Studies will also investigate how much information the devices collect (without informing their buyers of the process). The tools and types of devices used for the experiments will be chosen by us. Results will be described in a research-styled paper, and possibly published (with all due recognition of authors).

Stretch goal 1

Select 1-2 more devices, to extend the variety of "common types of smart devices used at home".

Stretch goal 2

Add other tools for the analysis (where applicable).

5 PLANNING

We decided to do the project in three phases as you can see below:

5.1 Research phase

In the first phase of our internship, we will collect the information about types of exploits and vulnerabilities that we can find for a certain number of devices.

5.2 Test phase

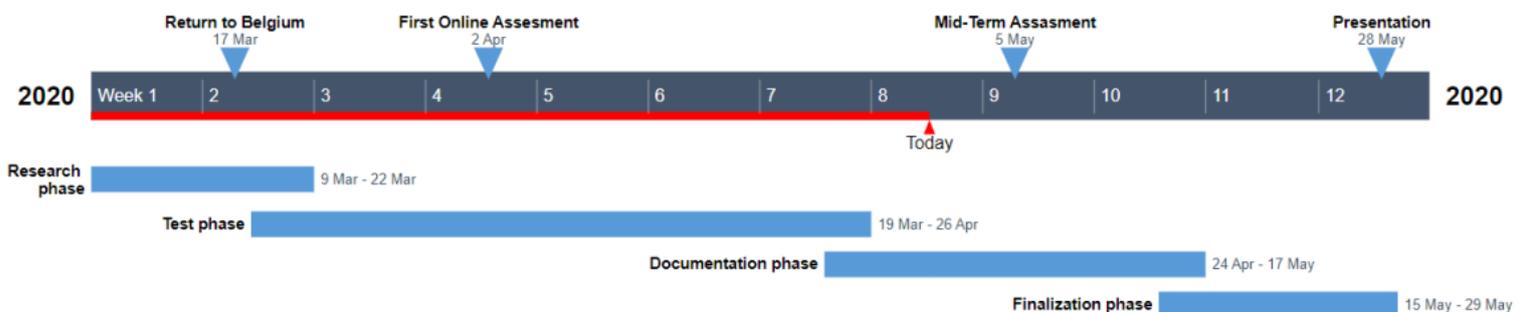
In this phase, we will evaluate whether the vulnerabilities and exploits that we found still work on the devices themselves and, in fact, also test the security of the devices.

5.3 Documentation phase

In this phase, we will document everything in one document to get a nice overview of all tested devices and what weaknesses they have. We can also add some solutions to this to improve safety.

5.4 Finalization Phase

In this phase, we will prepare our presentation.



6 PROJECT ORGANIZATION

For this project, we will be reporting to Torben Svane a Senior lecturer of Information Technology at Högskolan I Halmstad who gave us the project.

We will mostly be working together on the paper and the research of vulnerabilities of those devices.

6.1 Information and reporting

To keep our mentor (Torbe Svane) updated, we have scheduled weekly meetings to discuss the project status. These meetings will most of the time take place on Tuesday and Thursday. It will be a meeting on Skype.

We will also send our internship supervisor (Nathalie Bosschaerts) in Belgium a weekly email with the state of affairs.

7 CONCLUSION

So the conclusion here is that we are going to look at the security of IoT or smart home devices and here we are going to look at what data is being forwarded to the server and whether this data is visible to everyone (including someone with bad intentions). We will also check the devices for exploits and possible access points where a hacker can easily break-in. We will then document all our findings in our paper.

