

MASTER'S THESIS REVIEW

Author:	Bc. Jan Helbich
Thesis Title:	Energy impact of web user interface rendering technology on mobile devices
Thesis Supervisor:	Ing. Tomáš Černý, MSc., Ph.D.
Thesis Opponent:	Ing. Miroslav Macík Ph.D.

Assignment

The primary aim of the thesis was to evaluate an impact of various web UI rendering technologies on resource use on mobile devices, including evaluation of influence on the energy consumption. The measurements should be performed on devices based on Linux kernel, a prototype of SW analysis tool should be developed. A demonstrative web application to evaluate energy consumption should be developed. It should be based on technologies including JSF2, GWT, Angular JS 2, ReactJS and AspectFaces. From the results measured assess the economic consequences as well as consequences on possible energy management based on adaptive UI development technologies.

Technical Manuscript

The written part of the thesis is written in good English; however, there are articles missing here and there. It consists of seven chapters that correspond to the standard structure of a diploma thesis.

The first chapter starts with motivation to the work as well as with a brief introduction to the field of web-applications. Section 1.3 focuses on the statement of goals of the thesis. Here I would appreciate clearer structure. Follows related work section focusing mainly on energy impact of computation. I would expect more detailed analysis. Although the thesis cites 56 sources, 40 are "online sources" and only 9 are scientific papers. Also, there is an apparent mistake in the statement in chapter 1.4.1. (What would be Pn for non-utilized server accordingly to your statement?).

Chapter two - Analysis focuses mostly on energy and utilization measurement methods under Linux OS. It provides comprehensive information how to achieve data necessary for the implementation of the measurement tool for fronted energy consumption measurement.

In the third chapter, the author focuses on design of the measurement method and performance analysis tool (later referred as MWP). Also, the design of sample application Eventier - an event management system is briefly described here. Follows a description of the deployment infrastructure and environment. Description of tested front-end frameworks is quite comprehensive.

Flowing three chapters focus on validation of the measurement tool and two case studies. The first study focuses on power consumption evaluation using sample application Eventier. Deployment based on six distinctive UI technologies was considered. The second study focuses on the impact of "heavy" computation when performed on client or server side respectively. The validation and case studies prove the usefulness of the measurement tool as subject o the thesis.

The conclusion part is rather short but summarizes the most important achievements of the thesis. Clearer structure of goals in the introduction would make comprehension of what and to which extent have been achieved by the thesis much easier.

There are following issues in the manuscript:

- Quite frequent typos and missing/redundant articles/words. E.g. "We present a methodology to for our measurements...", "higher network traffic then server-side JSF..." (p.39), "For higher server load we a slight ..." (p.39).
- Missing explicit citation for Figure 3.5 (taken from an online source)
- References lack some important information. There is no accessed date for online sources. Also, there is a missing title for [16] (author's own paper).

Implementation

The implementation of the testing tool is based on information provided by Linux kernel in form of *procfs* and *sysfs* virtual file systems. Also, student implemented sample application using six different UI technologies. I have no substantial concerns about the implementation.

Questions

1. In 1.4.2., you state that WiFi is the more energy efficient than 3G, at least for high network traffic. What is the main reason?

Conclusion

Mr. Helbich proved that he is capable of performing independent engineering work on complex assignments. In agreement with the assignment, the primary aim of the thesis was to develop a tool capable of evaluation of an impact of various web UI rendering technologies. It should have been demonstrated on a case of application deployment based on various UI technologies. The presented work addresses this assignment well. The author of this thesis also was the first author of a scientific paper related to the topic of the thesis presented on ICITCS 2016 conference [1].

On the darker side, the analytical part could have been better supported in the literature. Also, there are quite frequent typos and imperfections that make the reading of the text much harder.

I assess the thesis with mark B (very good).

In Prague, January 23th 2016

Ing. Miroslav Macík, Ph.D.

References

[1] Helbich, J., & Cerny, T. (2016, September). Energy impact of web user interface technology on mobile devices. In IT Convergence and Security (ICITCS), 2016 6th International Conference on (pp. 1-3). IEEE.