

Tallinn University

Free software strategies of managing information and communication technology infrastructure in Estonia

Doctoral Study Plan

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Abstract

The topic of my doctoral thesis involves competences and experience in the field of free/libre open source software (FOSS or FLOSS but hereinafter FOSS). Planned research is devoted to developing strategies about managing Estonian state information and communication technology (ICT) infrastructure using FOSS and implementing its usage with goal of saving time and money. It has also security issues, which is also important scientific competence by Estonian Defence Ministry (Laar, 2012).

The current situation in Estonia includes mostly proprietary software and its based solutions. Institutions are mostly using Microsoft, Adobe, Corel and other proprietary companies software and its data formats. Even educational software are often requiring Microsoft Windows operating system, which is not free. Public sector in Estonia is spending approximately 2,24 million € per year for proprietary software procuring. Therefore Estonia is depending too much on proprietary software and its data formats, which are not cost effective and have security weaknesses. Also software piracy is still a problem in Estonian and also rest of societies in the world (Hinnosaar, 2003).

In Estonia (and also other countries in the world) there is interoperability framework, which tells among other things about using open formats and preferring FOSS is must be policy in procuring software to state. But Estonian government has insufficient strategies to implement FOSS usage efficiently.

Therefore there is a need to study and evaluate FOSS strategies and its usage at any level to achieve efficient and cost effective ICT management at the state level with also security in mind.

Background

Nowadays the preparation of future staff is done mostly by using Microsoft and also other proprietary software. Schools are teaching students to use Microsoft software products and also other proprietary programs at computers. There is very rare cases, when we can see FOSS applications to be taught. Public and also commercial sector are often forced to use Microsoft software due to fact, that there is mostly Microsoft-educated staff on the job market (Page, 2009; Baseman, Warren-Boulton, Woroch 1995).

Situation in Europe

In the European Interoperability Framework (EIF) introduction there is mentioned, that the Framework would be based on open standards and encourage the use of open source software (EIF, 2004, p. 5, p. 9, p. 24). Around the world, free software is already quite popular (Laugasson, 2010). In Europe are OpenDocument file formats also quietly spreading¹.

Some FOSS researches in Europe:

Year	Name	Theme
2001	Patrice-Emmanuel Schmitz	Study on the use of Open Source Software in the public sector ²
2002	Patrice-Emmanuel Schmitz Sébastien Castiaux	Pooling open source software ³
2003	Steve Hnizdur Keith Matthews Eddie Bleasdale Alain Williams Andrew Findlay Sean Atkinson Charles Briscoe-Smith	Open Source Migration Guidelines ⁴
2004	Séverine Dusollier Philippe Laurent Patrice-Emmanuel Schmitz	Open Source Licensing of software developed by The European Commission ⁵
2004	Telematics between Administrations Committee (TAC)	TAC approval on conclusions and recommendations on open document formats ⁶
2005	Rishab Aiyer Ghosh Ruediger Glott Gregorio Robles Patrice-Emmanuel Schmitz	Partnering with Open Source Developers: Guideline for public administrations ⁷
2005	Rishab Ghosh Reinier Bakels	Patents and open source software - What public authorities need to know ⁸

1 <http://www.eionet.europa.eu/software/opendocument> , <http://www.odf-eag.eu/> 07.07.2012

2 <http://joinup.ec.europa.eu/elibrary/case/study-use-open-source-software-public-sector-2001> 05.07.2012

3 <http://joinup.ec.europa.eu/elibrary/case/pooling-open-source-software-2002> 05.07.2012

4 <http://joinup.ec.europa.eu/elibrary/case/open-source-migration-guidelines-2003> 05.07.2012

5 <http://joinup.ec.europa.eu/elibrary/case/open-source-licensing-software-developed-european-commission-applied-circa-solution-20> 05.07.2012

6 <http://ec.europa.eu/idabc/en/document/2592/5588.html> 05.07.2012

7 <http://joinup.ec.europa.eu/elibrary/case/partnering-open-source-developers-guideline-public-administrations-2005> 05.07.2012

	Patrice-Emmanuel Schmitz	
2005	Rishab Aiyer Ghosh Ruediger Glott Gregorio Robles Patrice-Emmanuel Schmitz	Guidelines for Public Administrations on Partnering with Free Software Developers ⁹
2005	Rishab Aiyer Ghosh Ruediger Glott Patrice-Emmanuel Schmitz	Partnering with Public Administrations: A short guide for OSS developers ¹⁰
2006	Rishab Aiyer Ghosh	Economic impact of open source software on innovation and the competitiveness of the Information and Communication Technologies (ICT) sector in the EU ¹¹
2006	Pan-European eGovernment Services Committee	Promotion of Open Document Exchange Format ¹²
2010	Rishab Aiyer Ghosh Ruediger Glott Patrice-Emmanuel Schmitz Abdelkrim Boujraf	Guideline on public procurement of Open Source Software ¹³
2012	Malta Government	OSS in Public Administrations: Malta ¹⁴

There is also European Framework Programme 8, which is called Horizon 2020¹⁵ now. In the document Proposal for a Regulation of the European Parliament and Council establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)¹⁶ there is requirement (p. 44), that at 2020 should European ICT market share one third part of world's market. It would be shame if this will be mostly achieved by purchasing proprietary software licenses and not by real research, innovation, development. These goals (major activity lines at p. 45-46) can be much more efficiently and economically achieved by using free software – then there remains much more money for real research, innovation, development and also staff knowledge will be better improved.

Information and communication technology (ICT) is top priority also at the document Proposal for a Council Decision establishing the Specific Programme implementing Horizon 2020¹⁷ (p. 10).

8 <http://joinup.ec.europa.eu/elibrary/case/patents-and-open-source-software-what-public-authorities-need-know-2005> 05.07.2012

9 <http://joinup.ec.europa.eu/elibrary/case/guidelines-public-administrations-partnering-free-software-developers-2005> 06.07.2012

10 <http://joinup.ec.europa.eu/elibrary/case/partnering-public-administrations-short-guide-oss-developers-2005> 06.07.2012

11 <http://ec.europa.eu/enterprise/ict/policy/doc/2006-11-20-flossimpact.pdf> 05.07.2012

12 <http://ec.europa.eu/idabc/en/document/3428/556.html> , <http://ec.europa.eu/idabc/en/document/3439/5585.html> 05.07.2012

13 <http://joinup.ec.europa.eu/elibrary/case/guideline-public-administrations-procurement-and-open-source-software-updated-june-201> 05.07.2012

14 <http://joinup.ec.europa.eu/elibrary/case/oss-public-administrations-malta-0> 06.07.2012

15 <http://ec.europa.eu/research/horizon2020/> 08.07.2012

16 [http://ec.europa.eu/research/horizon2020/pdf/proposals/proposal_for_a_regulation_of_the_european_parliament_and_of_the_council_establishing_horizon_2020_-_the_framework_programme_for_research_and_innovation_\(2014-2020\).pdf#view=fit&pagemode=none](http://ec.europa.eu/research/horizon2020/pdf/proposals/proposal_for_a_regulation_of_the_european_parliament_and_of_the_council_establishing_horizon_2020_-_the_framework_programme_for_research_and_innovation_(2014-2020).pdf#view=fit&pagemode=none) 08.07.2012

17 [http://ec.europa.eu/research/horizon2020/pdf/proposals/proposal_for_a_council_decision_establishing_the_specific_programme_implementing_horizon_2020_-_the_framework_programme_for_research_and_innovation_\(2014-2020\).pdf#view=fit&pagemode=none](http://ec.europa.eu/research/horizon2020/pdf/proposals/proposal_for_a_council_decision_establishing_the_specific_programme_implementing_horizon_2020_-_the_framework_programme_for_research_and_innovation_(2014-2020).pdf#view=fit&pagemode=none) 08.07.2012

Situation in Estonia

In the Estonian Interoperability Framework (2011), which is created using European Interoperability Framework in mind, is written: „*In the context of the framework, openness means that public sector takes into consideration the alternatives of open specifications, standards and software. When developing or ordering software, public sector should use the development methods of free software*“ (p. 11). When procuring software, free software alternatives MUST be taken into account (p. 11). When founding information systems and in public procurements' tender offers, alongside proprietary solutions, free software alternatives MUST be taken into consideration. Decision MAY be made in favour of free software, proprietary software or a combined solution, but in case other conditions are equal, software with a source code is preferred. Each case is decided on an individual basis (p. 35).

Some Estonian researches, which are made on FOSS field:

Year	Name	Theme
2001	Tanel Tammet, PhD	Suggestions of free software usage at state computer systems ¹⁸
2002	Toomas Vananurm	Office work arrangement by Linux-based software
2003	Henrik Veenpere	Openness and stratification ¹⁹
2003	Harti Kiveste	Replacing Windows with Linux ²⁰
2004	Kaido Kikkas, PhD	Penguin ABC ²¹
2005	Ivari Horm	GNU/Linux I ²²
2005	Ivari Horm	GNU/Linux II ²³
2005	Ivari Horm	GNU/Linux III ²⁴
2005	Ivari Horm	GNU/Linux IV ²⁵
2006	Peeter P. Mõtsküla	Free software – threat or opportunity? ²⁶
2007	NGO Eesti Tehnoloogia Areng, Department of State Informations Systems (RISO)	Analysis of office software alternatives in Estonian public sector ²⁷
2008	Olle Leesment	Prospect of free software at Estonian Defence Guard ²⁸
2008	Green Party, Estonian Parliament (Riigikogu)	Resolution of the Riigikogu „Remedy to reduce costs and encourage innovation in state information technology“ 374 OE ²⁹
2009	Sander Lepik	An alternative solution to the Windows Home Server: Linux-based

18 <http://www.riso.ee/et/files/vabavarariik1dec.rtf> 05.07.2012

19 http://www.ria.ee/lib/am-2001-2005/6144_55E.HTM 05.07.2012

20 <http://www.physic.ut.ee/instituudid/efiti/loengumaterjalid/ara/linux/linux.pdf> 05.07.2012

21 http://kakupesa.net/pingviiniaabits/pingviiniaabits_CC.pdf 05.07.2012

22 <http://study.risk.ee/files/2011/06/gnulinixI.pdf> 05.07.2012

23 <http://study.risk.ee/files/2011/06/gnulinixII.pdf> 05.07.2012

24 <http://study.risk.ee/files/2011/06/gnulinixIII.pdf> 05.07.2012

25 <http://study.risk.ee/files/2011/06/gnulinixIV.pdf> 05.07.2012

26 <http://www.e-ope.ee/images/50001107/wbt.pdf> 05.07.2012

27 <http://www.riso.ee/et/koosvoime/vabavara/kontoritarkvara> 05.07.2012

28 http://www.cs.tlu.ee/instituut/opilaste_tood/magistri_tood/kevad_2008/Olle_Leesment/Olle_Leesment_Magistri_Tood.pdf 05.07.2012

29 http://www.riigikogu.ee/index.php?page=en_vaade&op=ems&enr=374OE&koosseis=11 05.07.2012

		home network server ³⁰
2009	Liina Kasvand	Free software – what and why? ³¹
2009	Hillar Põldmaa	Free software usage suggestions for public sector ³²
2010	Ministry of Economic Affairs and Communications	Software framework 1.0 ³³
2010	Kaido Kikkas, PhD	Free software influence for projects in higher education ³⁴
2010	Margus Püüa	Free software and state IT-policy ³⁵
2010	Edmund Laugasson	Free software at general education ³⁶
2010	Anto Veldre	Free software and security ³⁷
2011	Uuno Vallner, PhD	Estonian free software policy ³⁸
2012	Margus Perle	Workstation project for Tallinn University students based on free software ³⁹
2012	Ministry of Economic Affairs and Communications	Software framework 2.0 ⁴⁰
2012	Uuno Vallner, PhD	Free software usage at public sector ⁴¹

Aim

The aim of my PhD thesis is to investigate and describe free software strategies to implement efficient, cost effective and secure information and communication technology management at state level in Estonia.

Research questions and hypothesis

According the described situations above there is main topic to create for state survival and practical guide based on free software strategies. Currently in Estonia there are five state procurements at free software field but state has no good idea, how to enforce them. Also there are security issues need to be solved – malware is influencing mostly proprietary software and therefore putting in danger also mission critical data at state level.

30 http://www.cs.tlu.ee/instituut/opilaste_tood/bakalaureuse_ja_diplomitood/2009_kevad/sander_lepik_bakalaureusetoo.pdf 05.07.2012

31 http://www.cs.tlu.ee/instituut/opilaste_tood/seminari_ja_proseminari_tood/2009_sygis/liina_kasvand_seminaritoo.pdf 05.07.2012

32 http://www.riso.ee/et/files/VabavaraSoovitused_final_v10.odt 05.07.2012

33 <http://www.riso.ee/et/files/tarkvara-raamistik-v1.pdf> 05.07.2012

34 http://www.ria.ee/public/Programm/2010_koolitused_info/vabatarkvarainfopaev2010/12_KaidoKikkas.pdf 05.07.2012

35 http://www.ria.ee/public/Programm/2010_koolitused_info/vabatarkvarainfopaev2010/1_MargusPyya.pdf 05.07.2012

36 http://www.ria.ee/public/Programm/2010_koolitused_info/vabatarkvarainfopaev2010/11_EdmundLaugasson.pdf 05.07.2012

37 http://www.ria.ee/public/Programm/2010_koolitused_info/vabatarkvarainfopaev2010/5_AntoVeldre.pdf 05.07.2012

38 <http://www.novell.com/global/latvia/events/2011/110308.avatud.lhtekoodi.poliitika..pdf> 05.07.2012

39 http://www.cs.tlu.ee/instituut/opilaste_tood/seminari_ja_proseminari_tood/2010_kevad/margus_perle_seminaritoo.pdf 05.07.2012

40 <http://www.riso.ee/et/koosvoime/software-framework.odt> 05.07.2012

41 <http://www.seminar.aripaev.ee/images/originalimages/Uuno%20Vallner-11631.pdf> 05.07.2012

Research questions are:

- how to change state staff working environment from using only proprietary software to use free software as much as possible
- how to increase people awareness about free software and its security, compatibility, benefit
- how to establish the usage of OpenDocument and Portable Document Format (PDF) at state level mentioned at State IT Architecture v1.01 (2007)
- how to solve any compatibility issues and increase awareness about it

Objectives

Data gathering, situation overview:

- analyze of current literature about researches and frameworks concerning the free software in Europe and Estonia
- create an ontology of appropriate terms
- ascertain the current software profile and its usage in all eleven ministries⁴² and government⁴³ in Estonia: computer program identity, functionality, usage purpose, saved data file format, security risks
- testing awareness – for that using surveys, interviews

Collected data processing:

- preparing report of appropriate literature (incl frameworks) tied with free software
- preparing report of software profiles at Estonian ministries and Government
- producing ontology of appropriate terms

Finalizing research

- completed reports analysis to obtain results – at the end of research we will have comprehensive and narrative report with ontology, free software and open file formats implementing strategies, descriptive solutions about possible compatibility issues and myths about free software with security in mind
- producing printed book with completed research results and giving it to the Estonian Government

Keywords

- free software
- open source
- proprietary software

42 <http://valitsus.ee/et/valitsus/ministeeriumid> 06.07.2012

43 <http://valitsus.ee/en/government> 06.07.2012

- security
- file formats
- compatibility
- awarness
- myths about free software

Methods

Used methods are:

- survey – collecting data from subjects under investigation
- interview – collecting data from subjects under investigation
- archival research – collecting data about literature

General importance and relevance

In Estonia there are five state procurements about free software: one for software framework 2.0⁴⁴ and four for LibreOffice⁴⁵ (creating LibreOffice Estonia portal, translating, speller and thesaurus, creating teaching material). Also the OECD report „Towards a more unified governance“ a brief summary of the recommendations tells, that there is a need to offer public services more effectively by unifying used standards, which increases availability (Office of the State, 2011). OECD suggests for Estonia to harmonize our IT-systems and increase co-operation between different ministries. These state procurements and OECD report also means open standards and file formats usage for hassle free exchange of electronic documents, which are available to all citizens regardless of wealth. According to the report of Opportunities for Cooperation between Estonia and Finland (Opportunities for Cooperation between Estonia and Finland, 2008) there is overall IT-market size 40% of European IT market – this is reasonable amount of computers, which all needs software. Reducing government and its subordinate establishment administration expenses is also one of OECD recommendations – especially, when it has 40% of EU IT-market. Such sustainable capability will be available when to use free software. When taxpayer's money remains to state there can be create new job places in Estonia and certainly in rest of Europe. Using free software there is no need to worry about licence fees and you can use it to as many computers as you need.

Estonia has also the document called State IT Architecture v1.01 (2007)⁴⁶, which defines among other things also saved document file formats (OpenDocument and Portable Document Format) which should be used at public sector and why not also other sectors. But mostly this document is not observed by citizens and also state staff and almost everyone is using those formats, what she/he wants

44 <http://www.riso.ee/et/node/518> 06.07.2012

45 <http://www.riso.ee/et/LibreOffice-tugihanked> 06.07.2012

46 http://www.riso.ee/et/koosvoime/RITA1_01.pdf 06.07.2012

to (mostly Microsoft Office ones). In such situation talking about interoperability at exchanging electronic documents between institutions is quite complicated. Here comes in free software and open, standardized document file formats with deployment strategies invented by this thesis. With proprietary file formats there is also vendor lock-in problem (Zhu, Zhou, 2007).

Schedule

By the end of the **first** year of research I will have:

- established a regular routine of meetings with supervisor
- completed a comprehensive bibliographical survey of literature relevant to the research topic
- started ontology
- created surveys for data collecting
- refreshed knowledge's of data analysis in the PhD level
- refreshed knowledge's of academic writing in English language
- organized Free Software Day to introduce free software

By the end of the **second** year of research I will have:

- starting of data collection from Estonian ministries and government
- continuing ontology
- completed in first draft some further text intended for the final thesis, ideally a further one chapter

By the end of the **third** year of research I will have:

- completed data collection from subjects under investigation
- continuing ontology
- completed in second draft some further text intended for the final thesis, ideally a further one chapter

By the end of the **fourth** year of research I will have:

- completed the writing of thesis (incl ontology) having had intensive supervision to discuss each chapter
- have completed the final draft of PhD thesis for submission
- defend the doctoral thesis
- defended and printed doctoral thesis is delivered to Estonian Government

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Thesis supervisor/student agreement

Student

I hereby agree to carry out doctoral thesis research and study within the framework described above, by supervision of professor Kaido Kikkas .

Rapla 08.07.2012

Edmund Laugasson

/digitally signed/

Supervisor

I hereby agree to supervise the previously described doctoral thesis, which is carried out by Edmund Laugasson.

Tallinn 08.07.2012

Associate Professor Kaido Kikkas

Tallinn University

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