An Interdisciplinary Perspective of Dependability in Open Source Software

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Overview

- Context
- What is OSS?
- Preliminary Conclusions
- Evaluating the Dependability of OSS Products
- Deriving Dependability Insights from OSS Products
- Future Work

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Context

- Within the DIRC (Interdisciplinary Research Collaboration in Dependability) project
  - 1 year activity
  - Feasibility study for further activities in the area of development of dependable systems using open source approaches
- Several students' dissertations
  - Investigating Open Source projects

What is Open Source Software (OSS)?

- Lack of precise use of the term
- Usually a combination of one or more of
  - Licensing model
  - Visibility of source code
  - Right to modify
  - Multiple reviewers
  - Multiple contributors

What is OSS?

- Open Source Definition (OSD)
  - Provided by Open Source Initiative (OSI)
  - Addresses legal and (some) economic issues
    - Ability to distribute software freely
    - Source code's availability
    - Right to create derived works through modification
- The many meanings of Open Source
  - View from various disciplines: CS, Management, Psychology, Sociology
  - Finding common and varying characteristics of open source projects

What is OSS?

COMMON

Adherence to OSD

Developers are users

What is OSS?

COMMON	*VARIABLE*
Adherence to OSD	Starting points
Developers are users	Motivation
	Community
	Software development support
	Licensing
	Size

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Accepting submissions

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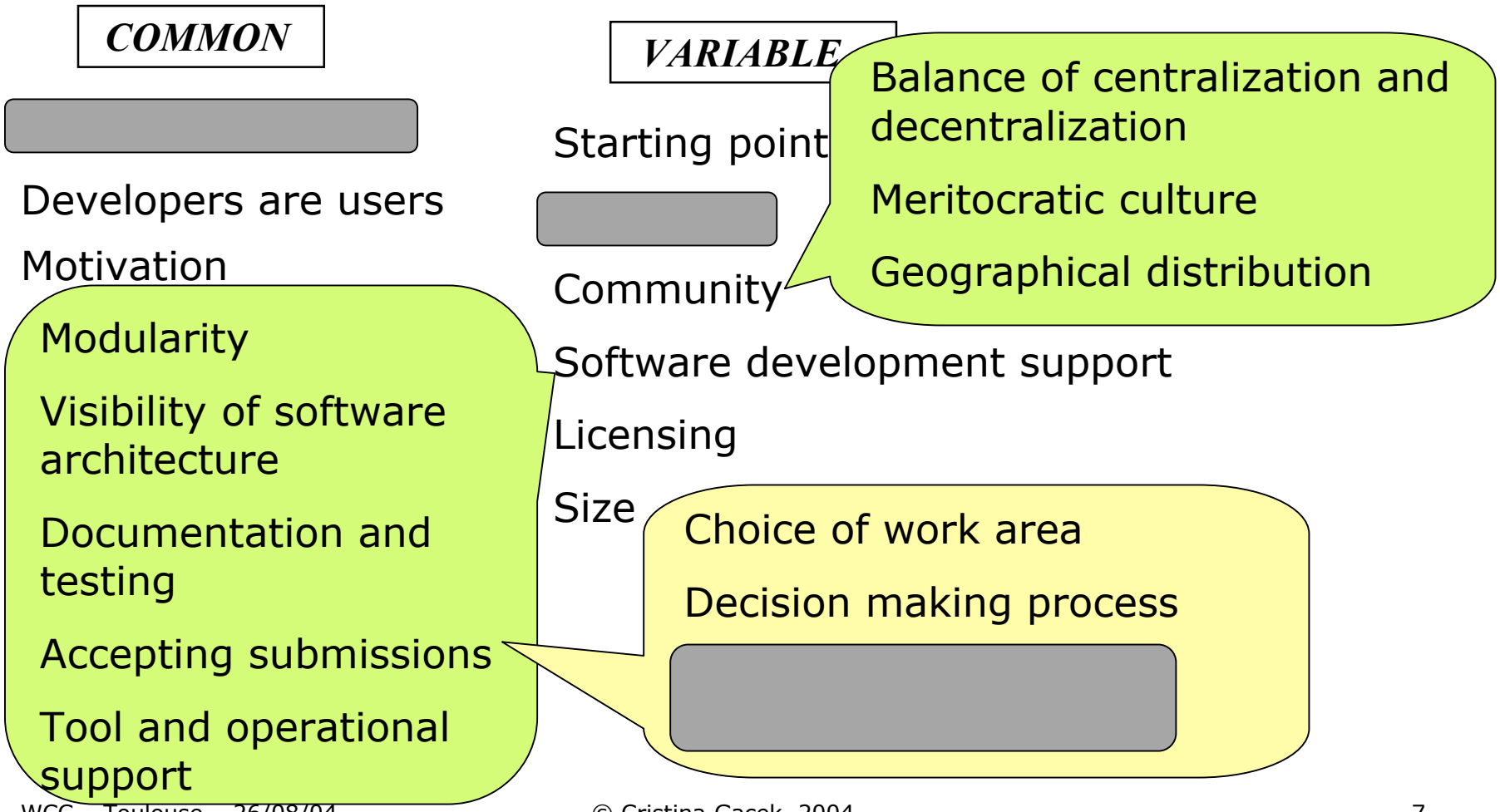

Preliminary Conclusions

- The term "Open Source" is often used in a vague manner
- OSS characteristics facilitate a better understanding
- As much variation exists between OSS projects as between any set of projects
- It is not meaningful to bundle all OSS products and projects into one category
  - Apache and Linux
  - Topologilinux and Frozen Bubble
  - 329 compilers in Freshmeat.net on 24/08/04

Stereotypes About the Dependability of OSS Products/Projects

- OSS products contain fewer faults because they have been reviewed by many people.
- OSS products are more secure because they have been reviewed by many people.
- OSS products have little to no design documentation available.
- Having little design documentation available does not impact an OSS project as negatively as it would a "traditional" one. The reason being that OSS developers contribute towards development for their joy and pleasure, and consequently are less likely to leave the project than an employee to change jobs.
- OSS products are developed by hackers in their free time, who only submit code for consideration once a high standard of quality has been achieved.

Evaluating the Dependability of OSS Products

- Like that of "traditionally" developed software
  - Needs to be done on a case by case basis
  - Different versions and releases of the same product must be considered individually
- Who would be responsible for pursuing certification?
  - One possible model: have interested companies work towards needed certification

Deriving Dependability Insights from OSS Products/Projects

- OSS characteristics are not restricted to OSS, hence insights from OSS can be used in other settings
- Studies are much easier to conduct in OSS than in "traditional" settings
  - Information available electronically
  - Time consuming to locate and collate related info
  - Key players usually receptive to queries
- Our results to date show a strong correlation between the quality of installation documentation and code readability

Future Work

- Study openness characteristics that foster more dependable systems
  - Which combinations of characteristics are beneficial?
  - Which combinations of characteristics are detrimental?
- Replicate results from OSS into "traditional" environments
- Explore avenues for adopting OSS into critical systems' settings