

Strategies for Developing and Deploying Free/Open Source Software

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Overview

- Background
- Results from recent studies
- Open university
- Open source processes
- Strategies
- References

What is free/open source software development?

- Free (as in “freedom”) vs. open source
 - Freedom to access, browse/view, study, modify and redistribute the source code
 - Free is always open, but open is not always free
- F/OSSD is not “software engineering”
 - *Different*: F/OSSD can be faster, better, and cheaper than SE
- F/OSSD involves *more* software development tools, Web resources, and personal computing resources, compared to traditional SE methods.

Who is investing in F/OSSD?

- Large corporations: (IT and Financial)
 - IBM-*Eclipse*, Sun-*NetBeans* and *OpenOffice*, HP-*Gelato*, Apple-*Darwin*, Microsoft Research-*Rotor*, SAP-*SAPDB/MySQL*, etc.
 - Barclays Global Investors, Dresdner Kleinwort Wasserstein
- National Laboratories: LANL, LLNL, JPL
- Federal Government: DoD, NSF
- Mid-size corporations:
 - RedHat, Novell
- Small (start-up) companies:
 - ActiveState, Collab.Net, Jabber, Ximian, JBoss, Compiere, etc.

Findings from F/OSS Studies

- *C/O* 2002-2003:
 - OSS primarily for new system deployments
 - OSS benefits
 - enable lower TCO (e.g., Fitzgerald and Kenny, 2004)
 - lower capital investment
 - greater reliability
 - OSS weaknesses:
 - lack of in-house skills or skills in labor market,
 - lack of vendor support or vendor viability
 - switching costs

Findings from F/OSSD Studies

- Hars and Ou 2002:
 - >60% of F/OSS developers work on 2-10 F/OSS projects
- Madey, et al. 2003:
 - <5% of OSS projects on SourceForge.net sustained;
>90% have only one contributor (i.e., Power Law)
- Nichols and Twidale 2003:
 - Usability of F/OSS systems generally neglected
- Scacchi 2002-2004:
 - Largest F/OSSD projects sustain exponential growth;
most F/OSSD projects fail to grow to any sustainable effort

Processes for F/OSS Requirements or Design (Scacchi 2002)

- F/OSS Requirements/Designs
 - not explicit
 - not formal
- F/OSS Requirements/Designs are embedded within “informalisms”
 - Examples: threaded email discussion lists, Web sites, FAQs, source code directories, licenses
- F/OSS Requirements/Design processes are different from their SE counterparts.

Project management and career development (Scacchi 2004)

- F/OSSD projects self-organize as a *pyramid meritocracy* via *virtual project management*
 - Meritocracies embrace incremental mutations over radical innovations
 - VPM requires people to act in leadership roles based on skill, availability, and belief in project community
- F/OSS developers want to have fun, exercise their technical skill, try out new kinds of systems to develop, and/or interconnect multiple F/OSSD projects (*freedom of choice and expression*).

Open university?

- Free/open source software development
 - encourages sharing, examination, reuse, modification, and redistribution
- E-University
 - encourages adoption of E-Commerce or E-Business capabilities in university operations, administration, research, education
- *Open university*
 - embraces open source and E-University *systems, processes, practices, and communities*

Why open university?

- Help make the university work *faster, better, cheaper*
- Empower interested university employees, contractors, faculty, students and interested citizens to offer help and capture their contributions
- Enable creation of *public test-beds* where existing/new university processes can be demonstrated, manipulated, and refined.

Open source *processes*

- Free/open source software *does not* embody the processes for how to develop, deploy, use or sustain them
 - Deploying F/OSS is low-cost, but often inefficient and sub-optimal
- Closed source software development, deployment, use, and support is also inefficient and sub-optimal
 - Explicit open source processes could also help closed source systems.

Motivation for open source processes

- *Closed source processes:*
 - opaque or tacit, difficult to improve, subject to inappropriate automation by vendors
- *Open source processes:*
 - Enables *continuous process improvement* and *organizational learning* through open access to the “source code” of enterprise processes

Strategies for Developing and Deploying F/OSS

- Requirements and design artifact sharing
 - Emergent, continuously evolving
 - Structured vs. semi-structured vs. ad hoc
- Cost information/analysis sharing
 - Determine “business value” of F/OSS efforts
- Community and career development
 - Join/form F/OSSD consortia
 - Enhance local skill base
 - Encourage community ownership over individual contribution/fault

Strategies for Developing and Deploying F/OSS

- Open source processes:
 - F/OSS systems analysis and design
 - Deployment and support of F/OSS systems
 - Usability capture and feedback
 - Organizational transformation
- Stimulate/facilitate UC-based research into F/OSSD through partnerships
 - Institute for Software Research (ISR)
 - Center for Research in Information Technology and Organizations (CRITO)

Open university opportunities

- Establish OU Web portals and clearinghouse
 - Create/share process toolkits, libraries, repositories
- Co-sourced development of OU processes
 - amortize and share OU development costs across campuses
- Capture and codification of university process domain expertise
- Operational OU system and process demo's
 - OU prototypes and public test-beds
 - Exportable processes for university operations, administration, research, and education

ISR Research - Open Source Software Development - Mozilla

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Open Source Software Development

Overview UCI research in open source software development focuses on empirically-based studies of the processes, practices, and communities that

Analysis and Testing develop open source software. Ethnographic and virtual ethnographic research methods are employed in the field studies of open source software development

Architecture in communities that include those centered on Internet infrastructure, X-Ray astronomy and deep space imaging, networked computer games, and academic software design research.

Acquisition and Ecommerce

Computer-Supported Cooperative Work

Configuration Management

Education

Environments

Human-Computer Interaction

Hypermedia

Information Visualization

Internet-scale Event Notification

Open Source Software

Faculty

Walt Scacchi

Collaborators

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Projects

NSF ITR: Understanding Open Software Communities, Processes and Practices: A Socio-Technical Approach ([award abstract](#))
NSF ITR: Collaborative Research: Organizational Dynamics of Software Problems, Bugs, Failures, and Repairs ([award abstract](#))
NSF IIS: Collaborative Research: Research Directions for Continuous (Re)Design in Free/Open Source Software Systems ([award abstract](#))

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see <http://www.isr.uci.edu/research-open-source.html>

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- This presentation can be found at:
<http://www.ics.uci.edu/~wscacchi/Presentations/OSS-Strategies/>