Strategies for Developing and Deploying Free/Open Source Software

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Overview

- Background
- Results from recent studies
- Open enterprise
- 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, Merrill Lynch, etc.
- National Laboratories:
  - Los Alamos National Laboratory, Livermore National Lab, Jet Propulsion Lab
- Federal Government:
  - Dept of Defense, National Science Foundation
- Mid-size corporations:
  - RedHat, Novell
- Small/start-up companies:
  - ActiveState, Collab.Net, Jabber, JBoss, Compiere, etc.

Findings from F/OSS Studies

- *CIO* 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 *layered 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 enterprise?

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

Why open enterprise?

- Help make the securities enterprise work *faster, better, cheaper*
- Empower interested securities enterprise employees, contractors, analysts, and interested others to offer help and capture their contributions
- Enable creation of *public test-beds* where existing/new securities enterprise 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 for securities industry
  - 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 industry/university research into F/OSSD through partnerships

Open enterprise opportunities

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

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References

- A. Hars and S. Ou, Working for free? Motivations for participating in open source projects, *International Journal of Electronic Commerce*, 6(3), Spring 2002.
- G. Madey, V. Freeh, and R. Tynan, Modeling the F/OSS Community: A Quantitative Investigation, in *Free/Open Source Software Development*, ed., Stephan Koch, Idea Publishing, forthcoming.
- D.M. Nichols & M.B. Twidale, The Usability of Open Source Software, *First Monday*, 8(1), January 2003.
- J.S Norris, Mission-Critical Development with Open Source Software: Lessons Learned, *IEEE Software*, 21(1), 42-49, January-February 2004.
- B. Fitzgerald and T. Kenny, Developing an Information System Infrastructure with Open Source Software, *IEEE Software*, 21(1), 50-55, January-February 2004.

References

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

- W. Scacchi, Free/Open Source Software Development Practices in the Computer Game Community, *IEEE Software*, Special Issue on Open Source Software, 21(1), 59-67, January-February 2004.
- W. Scacchi, When is Free/Open Source Software Development *Faster*, *Better*, and *Cheaper* than Software Engineering? Working Paper, Institute for Software Research, UC Irvine, April 2003.
- W. Scacchi, *Open EC/B*: A Case Study in Electronic Commerce and Open Source Software Development, Final Report, July 2002.
- W. Scacchi, Understanding the Requirements for Developing Open Source Software, *IEE Proceedings--Software*, 149(1), 24-39, 2002.
- W. Scacchi, Redesigning Contracted Service Procurement for Internet-based Electronic Commerce: A Case Study, *J. Information Technology and Management*, 2(3), 313-334, 2001.

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