Open Source Labor Economics

Prof. Dr. Dirk Riehle

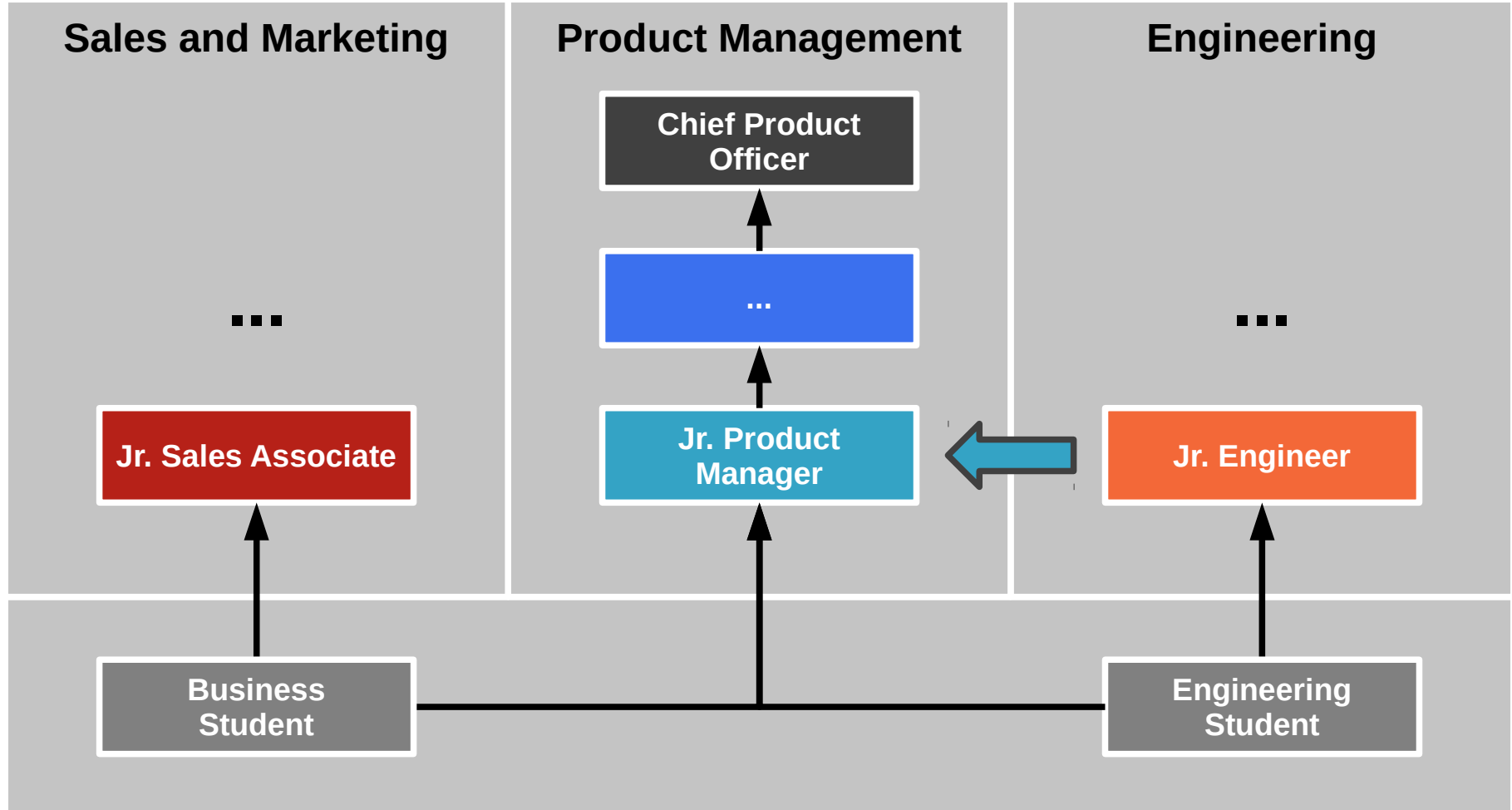**Friedrich-Alexander University Erlangen-Nürnberg**

FLOSS C07

Linus Torvalds

Why you should choose a career in Linux and open source

- Traditional motivations for participating in open source

    - Do something good (altruism)

    - Learn something

    - Have fun

Traditional Developer Careers

Sales and Marketing

Product Management

Engineering

Chief Product Officer

...

Jr. Sales Associate

Jr. Product Manager

Jr. Engineer

Business Student

Engineering Student

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Hiring Developers (Erich Gamma)

"[…] when I received the first job application with a link to a code contribution to an open source project, I immediately followed the link, reviewed the code, invited the candidate for an interview round, and eventually made an offer. A link to **a code contribution to an Open Source project is a great differentiator in a job application**, in particular when you have to select among a large number of applications."

Erich Gamma [R15a]

Committers in Your Network

Championing Open Source and Everything-as-a-Service - Cloud Computing, SDN and DevOps
Raleigh-Durham, North Carolina Area • Computer Software
▸ 29 shared connections • Similar • 👥 500+

Current: **Committer** at Apache CloudStack

Message

Philippe Ombredanne 1st
CTO and co-founder, nexB Inc. Open source enthusiast, hacker and entrepreneur, software librarian, code detective.
San Francisco Bay Area • Computer Software
▸ 13 shared connections • Similar • 👥 500+

Current: **Committer** at The Eclipse Foundation

Message

Martin Lippert 1st
Principal Software Engineer at Pivotal Inc.
Hamburg Area, Germany • Computer Software
▸ 52 shared connections • Similar • 👥 500+

Current: **Committer** on Equinox Weaving at Open Source

Message

Henri Yandell 1st
Open Source Architect
Greater Seattle Area • Computer Software
▸ 10 shared connections • Similar • 👥 500+

Current: **Committer**/Member at Apache Software Foundation

Message

Example (LinkedIn) Resume

Experience

Member of Technical Staff
Hortonworks

April 2012 – Present (2 years 2 months) | Bristol, England

Building the future of datacentre-scale applications on top of Hadoop.

Member
Apache Software Foundation

March 2000 – Present (14 years 3 months)

Active committer in the Hadoop core project
Inactive committer on the Ant build & test tool.
Inactive committer on the Axis SOAP stack.

Research Scientist
Hewlett-Packard Laboratories

1989 – March 2012 (23 years) | Bristol, United Kingdom

Current areas of research: the emergent open souce datacentre-OS stack based on Hadoop; cloud infrastructures and deployment of the Hadoop stack on cloud platforms. Key operational challenges of testing, scalability, reliabilty, and operations, and that of making the application agile enough to work the dynamic infrastructures which I am helping to build.

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1. Open source career stages

2. Value creation, signaling

3. Value appropriation

Open Source Developer Career Path

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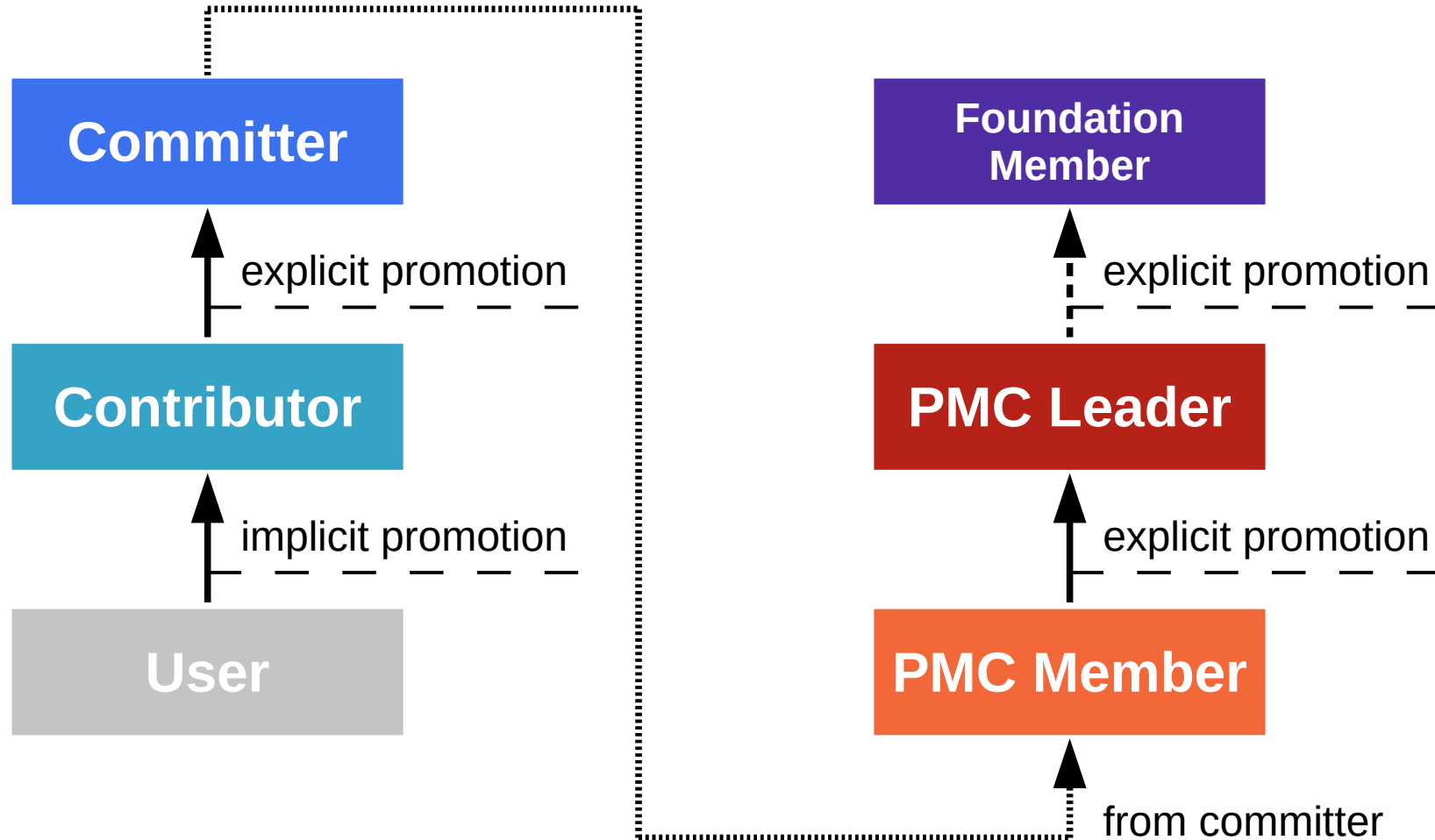
"Open source software is strategic to Google, and naturally **we hire a great number of open source developers**. Someone who demonstrates their ability by contributing to open source projects shows that **they are able to code in the real world** in ways other developers can not readily match. **It's the ultimate referral**."

Chris DiBona [R15a]

I.   Verifiable **technical skills**

II. Peer-confirmed **competencies**

III. Position of **power and influence**

1. Technical skills **in general**

2. Technical skills **for a project**

The Signaling Hypothesis [LT02]

- Open source is public work, more precisely measurable, and less captive that traditional work

- Developers **compensate opportunity costs by "signaling" marketable skills** to future employers

- At time of publication of [LT02] (2002), authors said volunteer developers were dominant

Hiring Developers (Marten Mickos)

"From a software vendor's perspective, open source work on a developer's resume is a definitive plus. [...] **If the developer even contributed to our [open source] products, it increases their chance of being successful at our company:** Ramp-up time will be shorter and we know they are likely to be a better fit than an unknown developer. **All of this leads us to prefer open source developers when hiring**."

Marten Mickos [R15a]

1. **Peer-confirmed technical skills**

2. **Peer-confirmed social competencies**

3. **Peer-confirmed leadership competencies**

Value of Peer Confirmation

- Peer confirmation

  - Successful open source contribution implies technical skills
  - Skills are peer-confirmed and publicly documented

- Economic value

  - Confirmed technical skills reduce hiring risk
  - Lower hiring risk reduces uncertainty discount in salary negotiations

"When we look at a start-up, we look at the GitHub reposito-ries, we look at Ohloh.net. **We drill down to the level of individual developers. It informs our investment decision. That fact alone gives open source software developers significant leverage when negotiating their position, salary, and benefits with startups.**"

Rachel Chalmers [R15a]
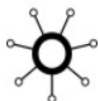
collectd

⚙ Settings | ⚑ Report Duplicate

Moderate Activity

30
I Use This!

Project Summary

collectd is a small daemon which collects system information periodically and writes the results to an RRD-file.

What does collectd do?
collectd collects information about the system it is running on and writes this information into special database files. These database files can then be used to generate graphs of the collected data. collectd itself does not generate graphs, it only collects the data. You should use software like drraw to generate pretty pictures from these RRD-files. Nonetheless, sample scripts are included to get you started on own graphing scripts.

Tags

🏷 management   nagios   plugin   performance   logging   sysadmin

rrd   aggregator   systems_administration   rrdtool   network

network_monitoring   nms   statistics   cluster   aggregation   snmp

monitoring   distributed
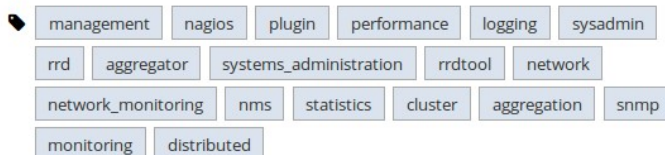
Share

f Like 0   🐦 Tweet 0   g+1 0   ⊕Share

In a Nutshell, collectd...

... has had 5,608 commits made by 236 contributors representing 112,408 lines of code

... is mostly written in C
with an average number of source code comments

⏱ Analyzed 2 days ago based on code collected 2 days ago.

Quick Reference

Project Links: ⬈ Homepage
                      ⬈ Download

Code Locations: git://git.verplant.org/collectd.git

Licenses: BSD-3-Clause and MIT

Similar Projects: 🌵 Cacti   ▣ GroundWork M...

                        OpenNMS   Opsview Core

Managers: octo

Browse Code

Languages

C	72%	Perl	17%
12 Other	11%		

C
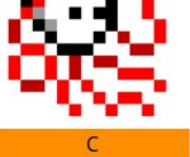
Account Summary

Analyzed *about 22 hours ago*

Projects Used

more
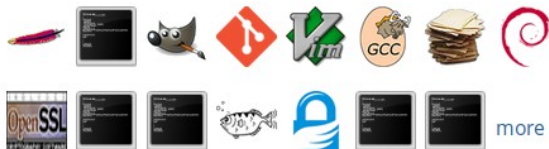
Most experienced in	C
First commit	over 8 years ago
Most recent commit	13 days ago
Has made	4190 commits
Joined Ohloh	almost 7 years ago
Contributed to	8 projects

Development History

Commits by Project   *May 2007 - Present*

Legend:
- collectd
- liboping
- tcpdump
- awesome
- tinc
- Pinba

200

150

100

50

0

2008 2009 2010 2011 2012 2013 2014
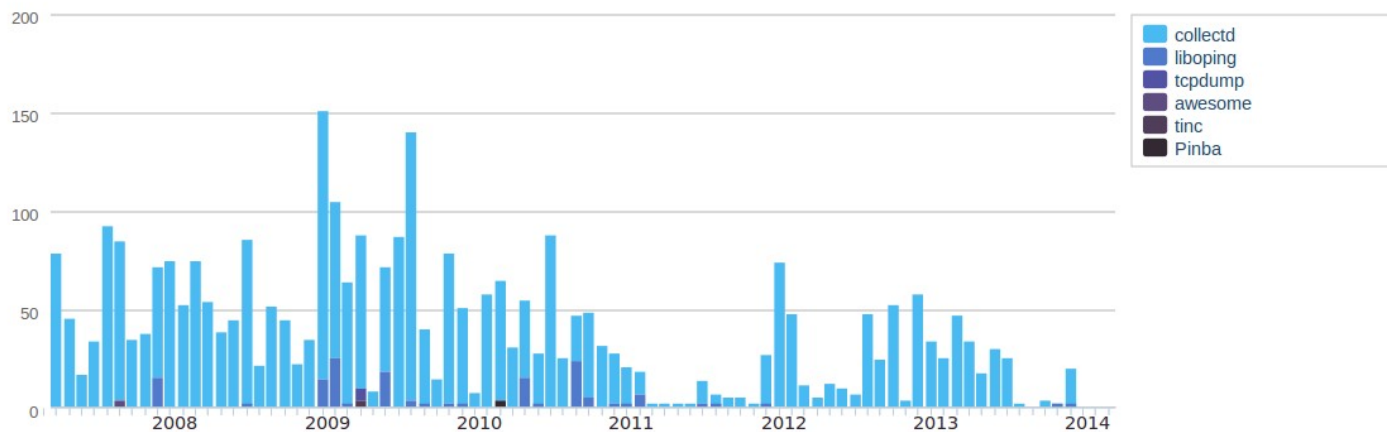
"Open source contributors tend to believe in and practice the values that characterize successful open source projects, such as **community, meritocracy and transparent government.** Hiring those people **strengthens those values within your corporate culture.**"

Robert O'Callahan [R15a]

1. **Position of power and influence in project**

2. **Visibility to community and beyond**

Value of Contributor Position

- The "Apache Committer study" [H+02]

  - Open source contributions in themselves don't correlate with higher wages
  - Higher status within merit-based Apache Software Foundation project does
  - Committers showed 29% higher salary after controlling for all variables
  - Study suggests that status is a proxy for otherwise unobservable skills

- The "c't Salary Survey" [B+10]

  - 61% of respondents believe open source activity benefits their career
  - Study shows no wage premium for voluntary open source contributions

"[...] **the wage of contributors with rank committer or above is on average about 29% higher than that of [other] developers** after controlling for education, program-ming experience, work experience, job switch, and firm char-acteristics." [H+02]

"**At the ASF, members of the Project Management Committee are recruited from the project contributors.** As the recognized stewards of the project, all PMC members **(including the appointed chair)** wield significant power over the project through the power of the veto."

Justin Erenkrantz [R15a]

More predictable project → Faster-better-cheaper development

More influence on project

Higher assumed competence → More and easier sales

More goodwill with community

More attractive employer → More effective recruiting
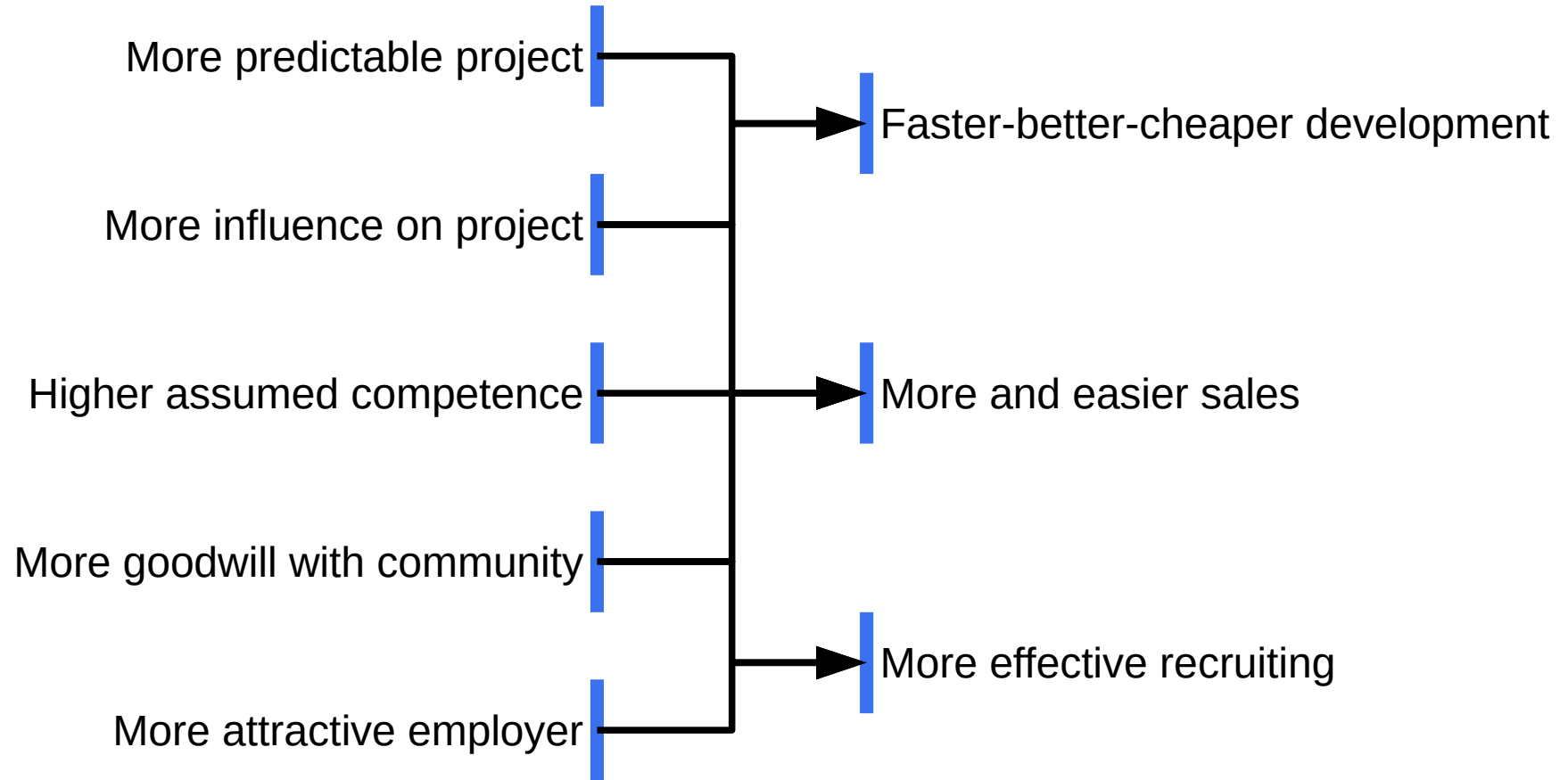
Faster-Better-Cheaper Development

- More predictable project
  - Because inside view allows for faster recognition of what's likely to happen
    - A committer has a deeper understand and insight into the project
    - A committer knows who to talk to and which knobs to turn
  - A more predictable project leads to
    - Problems get identified and fixed faster

- More influence on project
  - In case of leadership position
  - More influence leads to
    - Forming future strategic direction of project
    - Better strategic alignment of company products
      - Being aligned earlier, better, removes uncertainty and waste, lowers costs
      - Being aligned sets up employer to utilize new opportunities faster than others

More and Easier Sales

- Higher assumed competence
  - Because of project engagement
  - Higher assumed competence leads to
    - Customers believing that company is particularly capable

- More influence on project
  - Because of leadership position
  - More influence on project leads to
    - Customers believing that less things might go wrong

- More goodwill with community
  - Because of project engagement
  - More goodwill with community leads to
    - Higher visibility make leader a go-to-person wrt project
    - Higher likelihood for talks, panels, articles follows

More Effective Recruiting

- More attractive employer
  - Because of being a place with interesting work, interesting people
  - Being a more attractive employer leads to more effective recruiting

- More goodwill with community
  - Because of contributions to project
  - Having more goodwill with community leads to
    - Being reputed, being attractive, more effective recruiting

Relevance of Value to Employer

Component Type		Business Goal		
		Reduce Development Costs	Maximize Customer Exposure	Minimize Competition
	Proprietary Open Source	**Social leadership[2]**	**Domain ownership[2]**	**Copyright control[2] Trademark control[2] Development process[2]**
	Community Open Source	**Social leadership[1,2]**	**Social leadership[2,3] Domain ownership[3] Strategic positioning[2,3]**	**Trademark control[3] Development process[2,3] Strategic positioning[2,3]**

[1] Closed source firm   [2] Single-vendor open source firm   [3] Open source distributor

"My contributions to the Eclipse project (2000-2007) resulted in a high visibility in the Eclipse affine developer community. Pretty much **every offer I received during these years from potential employers explicitly referred to my reputation in the Eclipse project.**"

Kai-Uwe Mätzel [R15a]

1. **Higher salary**

2. **Higher job security**

3. **Richer job experience**

The Software Developer Labor Market

- A typical asymmetric market (less employers than employees)

  - Traditionally, work remains hidden (cf. reduced hiring risk)

- Contributor status does not provide a sustainable advantage

  - Everyone who is smart enough can contribute and gain recognition
  - No barriers to entry, there is always one more feature to implement
  - No barriers, because open source is freely available to everyone

- Committer status does provide sustainable positional advantage

  - Status has economic value, is not achieved or handed out easily
  - Mature projects are largely closed to new committers
  - Once achieved, committer status is not taken away easily

The Long-Run Perspective

- Regular developers
  - Employed to develop proprietary code
  - Know and use open source, may or may not contribute
    Lower barriers to labor market entry push down salaries

- Open source committers
  - Employed to work on commercially relevant open source
  - Committers' economic value is with open source project
  - Committers to behave more like free agents than employees
  - Scarcity of committer status may lead to superior salaries

- Developer labor market to become a two-class society?

Skills Profile of a Committer

- Need technical competence on project
  - Typically programming skills, but real projects need more
  - Configuration, administration, documentation, website, ...
  - An understanding of the processes of how systems are built

- Social skills are equally important if not more so
  - Need communication and collaboration skills for team work
  - Need good reading and writing skills (email communication)
  - Leadership skills are always rare and in demand
  - Need to understand peer behavior, subculture

- All things being equal, social skills are more important

How to Become a Committer?

- Achieving committer status is a communal process

  - Users work their way up from user to committer status
  - This builds reputation and reduces risk of wrong decision
  - Eventually, contributor is put up for committer status
  - Decision is typically made by vote of existing committers

- There is good and there is bad timing

  - A growing project needs more people, will give more responsibility early on
  - A mature project with slowing growth rarely needs more committers
  - Try to get in early when every helping hand is needed

- The prospective committer's dilemma: Which project to bet on?

Conclusions

- A new career path has emerged

  - It is related but different to prior paths

- Hypothesized effects on careers

  - In the short-run, open source developers may improve their wages
  - In the long-run, some form of peer confirmation becomes a must

- Effects on developer labor market

  - Reduced barriers to market entry make life harder for developers
  - The way out is to become a committer, but that is a scarce status
  - Committers to relevant open source projects can benefit significantly

Review / Summary of Session

- Developer engagement
  - Career stages
  - Value and signals
  - Value appropriation

- Value to company
  - Faster-better-cheaper development
  - More and easier sales
  - More effective recruiting

- Value to developer
  - Higher salary
  - Higher job security
  - Richer job experience

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Thank you! Questions?

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DR

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- Original version

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- Contributions

    - ...