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Collaborative Development Trends Report

Companies increase collaborative development, view as essential to success while developers reap rewards

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Executive Summary

Collaborative software development is on the rise. As technology companies face enormous pressure to innovate faster and cut costs in the face of major technology advancements, they're seeking software development approaches that leverage the open source community in order to remain competitive and excel. The rise of Linux and open source tools and components in the enterprise software industry over the past decade has been well documented. More recently, a new business model has emerged in which companies are joining together across industries to share development resources and build common open source code bases on which they can differentiate their own products and services. This collaborative approach is transforming industries from cloud computing and the datacenter, to automotive and mobile computing, and creating the next generation of technologies.

The Collaborative Development Trends Report seeks to help the community and industry better understand the factors driving the rise in collaborative development and what it means for the future of business and the way technology is built. In just the last few years, a proliferation of projects following this model has erupted. Some are hosted by The Linux Foundation – AllSeen Alliance, Code Aurora Forum, OpenBEL, OpenDaylight, OpenMAMA, Open Virtualization Alliance, Tizen, Xen Project, and Yocto Project - and others are hosted elsewhere but follow a similar collaborative approach. Examples include projects such as CloudStack, Hadoop and OpenStack, among others. This new and emerging way of building software is producing compelling business advantages for companies, as well as distinct benefits for the individual developers who participate. For the first time, this report provides data that supports that experience.

There are many definitions of open source and collaborative development. For the purposes of this survey and report, open source software is defined as software that can be freely used, changed and shared by anyone and is distributed under licenses that comply with the Open Source Definition (http://opensource.org/osd). Open, collaborative development is software development that involves multiple individuals and companies, in many cases competing in the same industry, and in which the code base is open source and a shared investment. Collaborative software development projects are managed collectively for the good of the whole community through code contributions and governance best practices. The Linux kernel community pioneered this approach to software development and their success has helped to inspire the spread of collaborative methods to other industries and technologies.

The report is the result of an invitation-only survey The Linux Foundation sent to its members during the first week of March 2014. Admittedly this group will have a positive bias towards collaborative software development, yet the companies polled are among those leading the collaborative development revolution and include such notables as Cisco, Fujitsu, HP, IBM, Intel, Google, NEC, Oracle, Qualcomm and Samsung, among others. The report captures responses from 686 software developers and business managers who represent some of the largest businesses in the world. The majority of respondents work at organizations with $500 million or more in annual revenue (69 percent) and more than 500 employees (76 percent).

The results show these professionals overwhelmingly recognize that collaborative software development is on the rise within their own organization and across industries; that it's central to their company or organization's mission; and that this trend is benefiting both the companies and the software developers who participate.
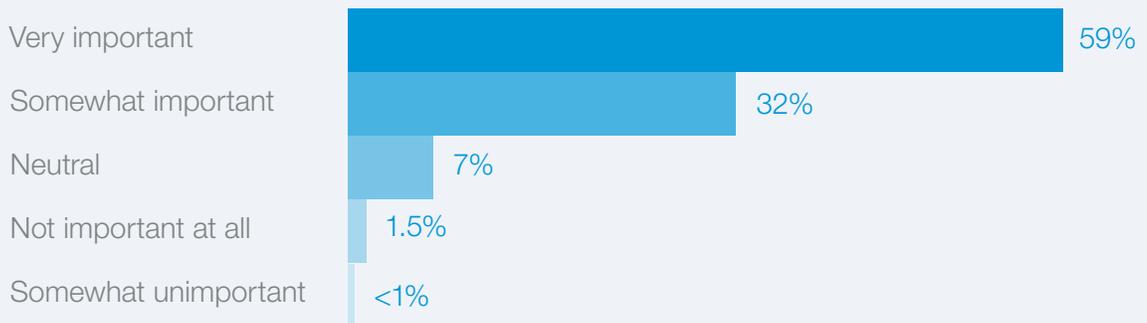
Key findings:

- **Companies get involved in collaborative software development to advance business objectives and to be part of industry innovation.** Ninety-one percent of business managers and executives surveyed ruled collaborative software development somewhat to very important to their business. And nearly 80 percent say collaborative development practices have been seen as more strategic to their organization over the past three years. Nearly half of business managers surveyed said they got involved in collaborative development because it allows them to innovate and/or help transform their industry.

- **Investments in collaborative software development are on the rise.** Among business managers and executives, 44 percent said they would increase their investments in collaborative software development in the next six months; 42 percent said they would sustain their current investment, and no one reported they would decrease their investment. Sixty-three percent of software developers surveyed said they spend more time now on collaborative software development, compared with five years ago. And 59 percent reported increased participation in collaborative software development in just the last year.

- **Individual developers and businesses both benefit from the trend toward collaboration.** Eighty-three percent of software developers said they benefitted personally from collaborative development through exposure to new tools and development practices. More than 77 percent of business managers said collaborative development practices have benefited their organizations through a shorter product development cycle/faster time to market.

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Business needs are driving increased adoption of collaborative development practices

Companies are increasingly choosing collaborative development practices because they're integral to their business strategy and they help meet new technology challenges that result in industry transformation or innovation.

Ninety-one percent of business managers and executives surveyed ruled collaborative software development somewhat to very important to their business. And nearly 80 percent of managers and executives, along with 63 percent of software developers, say collaborative development practices are seen as more strategic to their organization over the past three years.

Business managers and executives:
How important is collaborative development to your business/company?

Very important	59%
Somewhat important	32%
Neutral	7%
Not important at all	1.5%
Somewhat unimportant	<1%

Nearly half of business managers and executives surveyed said that they got involved in collaborative development because it allows them to innovate and/or help transform their industry. Business managers identified cloud computing, mobile devices, the Internet of Things, software-defined networking and operating systems as the top five areas of technology that are poised for disruption by new collaborative development practices over the next 12 months.

Top five technologies poised to be most disrupted by collaborative development in the next 12 months, according to business managers

1. **Cloud computing**
2. **Mobile devices**
3. **Internet of things**
4. **Software-defined networking**
5. **Operating systems**

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Open source and collaboration are so central to businesses that more than 78 percent of managers and executives surveyed said they have dedicated experts or legal counsel to manage governance and compliance on these projects. This is not surprising given that "politics" was the no. 1 challenge for collaborative development cited by managers (56 percent), followed by legal issues at no. 2 (55 percent). As the use of collaborative development practices rises, so does the need for experts who specialize in mitigating these concerns to build an efficient model for leveraging open source software. It's an indication of just how far the enterprise software industry has come in recognizing the business value of open collaboration.

Companies and developers partner on introducing collaborative development practices

Not only are business decisions driving up adoption of collaborative development practices, but companies and developers alike are introducing them – representing a shift in the way open source software and methods have traditionally been introduced.

Ten years ago open source software was largely a grassroots movement; developers undertook and contributed to open source projects and brought them into the workplace. Business managers oftentimes weren't even aware that their products were being built with open source tools and components. The origins of open source and collaborative projects in the enterprise are much different today, as business managers recognize open source software as a business imperative and are taking the lead in initiating open source participation. This approach makes particular sense with collaborative development, as business managers and executives have a more global view of company strategy and hold more authority to act on behalf of the entire organization in forming neutral alliances comprised of companies, developers and other organizations.

Software developers do still get started with open source and collaborative development by contributing to an open source project on their own time; overall, almost 35 percent said they started contributing in their free time. But even more are introduced to open source by their jobs, with 44 percent of software developers surveyed saying job requirements were the no 1. reason they started contributing. As further support of the changing narrative of open source in the enterprise, software developers with 10 or more years of experience were more likely to have started in their free time. Developers with less than 10 years of experience were more likely to start due to job requirements.

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Top five reasons for getting started in open source and collaborative development

Software developers:

1. **My job required me to contribute/ participate**
2. **Started contributing to an open source project in my free time**
3. **During college courses**
4. **Started an open source project**
5. **By taking Linux and/or open source training through a provider**

Organizations:

1. **Accelerates our product development and innovation**
2. **Openness, ability to modify code and influence its development**
3. **To reduce costs**
4. **To meet business objectives**
5. **To innovate and/or help transform our industry**

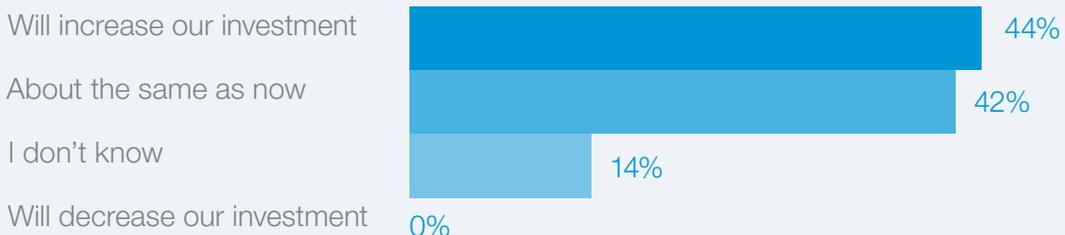# Investments in collaborative software development on the rise

As businesses get more involved in collaborative software development and see increasing benefits, they're investing more time and budget in this area. The survey results indicate that business use of collaborative development practices has been on the rise for at least the past five years. And, among business managers, 44 percent said they will increase their investments in collaborative software development in the next six months; 42 percent said they would sustain their current investment. None report planning to decrease their investment.

Sixty-three percent of developers surveyed said they spend more time now on collaborative software development, compared with five years ago. And 59 percent reported increased participation in collaborative software development in the past year.

That upward trend is set to continue with almost 80 percent of software developers and 91 percent of business managers and executives saying collaborative development practices in their organization are set to increase relative to other ways of building software over the next five years.

Business managers and executives:
What are your plans to fund collaborative software development in the next six months?

Will increase our investment	44%
About the same as now	42%
I don't know	14%
Will decrease our investment	0%

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Business managers and executives:
Relative to other ways of building software, in the next five years do you think the use of collaborative development practices in your organization will:

Increase	91%
Stay the same	7%
Decrease	2%
I don't know	0%

At the root of this trend is the rise of Linux and open source software within the enterprise. Sixty-one percent of software developers surveyed agreed that open source software and/or collaborative development are "on the incline" to become the de facto way to build software, while almost 33 percent said Linux and open source "dominate" software practices today. For companies that have embraced Linux and open source software, collaborative development is the natural next step along the spectrum of open source participation that begins with consumption -- using open source tools and components -- and progresses to contributions with increasing levels of commitment through fixing bugs, writing code and finally starting and leading new projects.

In particular, the use of open source software development tools is pervasive. Almost 96 percent of software developers surveyed said they use common open source software, such as Git and Subversion, for things like version control. And using open source development tools was the most common way both developers and managers indicated that their organizations participate in the open source community, with 93 percent of developers and 91 percent of managers and executives indicating their organizations use open source in this way. Indeed, the use of a common open source toolset for contributing, fixing and managing code is an important enabler of collaborative development both within and among organizations. It is the foundation on which collaborative communities can base their interactions.

Top 5 ways developers participate in the open source community

1. **Use open source development tools**
2. **Use open source in our commercial products**
3. **Participate in open source events**
4. **Test and submit bugs**
5. **Actively contribute code**

Individual developers and businesses both benefit from the trend toward collaboration

Collaborative software development may be more driven by business decisions now than in the past, but that hasn't hindered developers. On the contrary, 83 percent of software developers said they benefitted personally from collaborative development through exposure to new tools and development practices. Nearly 82 percent said they saw a significant growth in their skill set. And more than 68 percent said they gained a large, strong knowledge base from which to draw expertise and support, as a result of their participation in collaborative development. Developers who contribute to collaborative development projects are also prioritized for promotions. Almost 63 percent of managers said they prioritize promotions – 24 percent "most of the time" – for these developers.
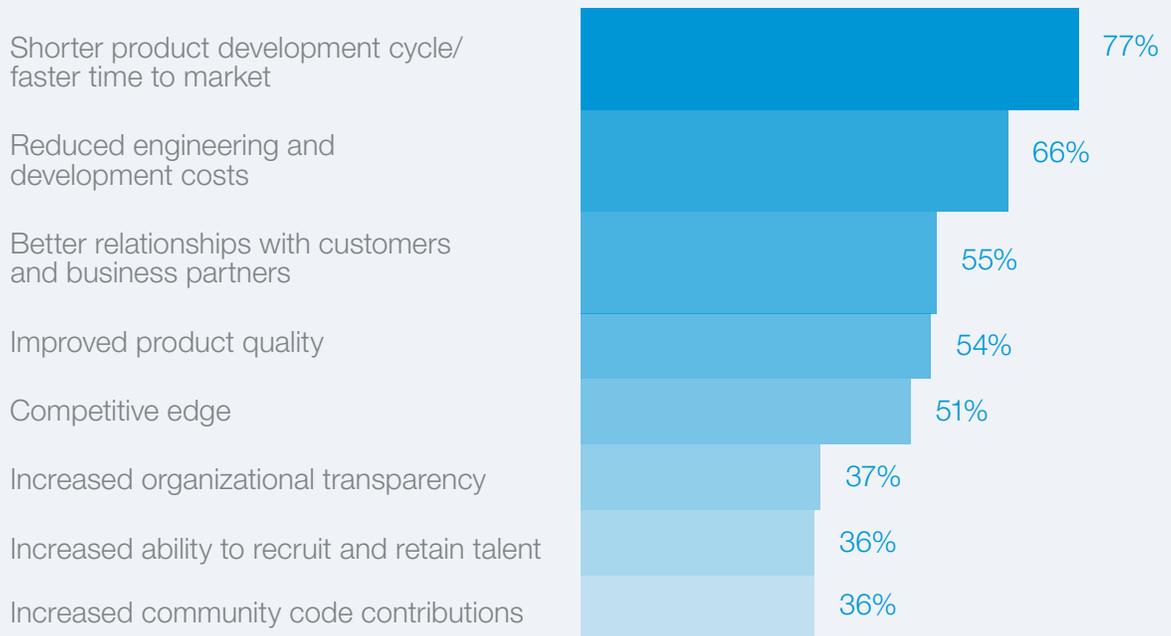
Software developers:
Top five benefits personally received from participating in collaborative development

1. **Exposure to new tools and development practices**
2. **Significant growth in my skill set**
3. **Large, strong knowledge base from which to draw expertise and support**
4. **Significant growth in my professional network**
5. **A sense and satisfaction that I'm involved in something bigger than any one company**

On the business side, managers reported many direct benefits of collaborative development, including a shorter product development cycle/faster time to market (77 percent); reduced engineering and development costs (66 percent); and better relationships with customers and business partners (55 percent). These benefits provide strong motivation for businesses to get more involved in open source communities and collaborative development. Almost 79 percent of managers said that their organization got involved in collaborative development because it "accelerates our product development and innovation." While 65 percent cited openness and the ability to modify code and influence its development. Fifty-four percent said it reduced costs.

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Business managers and executives:

What benefits of collaborative development has your organization experienced? (Respondents asked to check all that applied)

Benefit	Percentage
Shorter product development cycle/faster time to market	77%
Reduced engineering and development costs	66%
Better relationships with customers and business partners	55%
Improved product quality	54%
Competitive edge	51%
Increased organizational transparency	37%
Increased ability to recruit and retain talent	36%
Increased community code contributions	36%

Conclusion: Companies view collaborative development as key to their success

Collaborative software development has grown in popularity among enterprises over the past five years. Our data indicates that this is because business managers see tangible benefits of collaboration over other development methods, including faster time to market, lower development costs and improved business relationships. Collaborative development has become a necessary component of success for companies building software and innovating in a competitive global economy.

As the managers, executives and software developers we surveyed have predicted, growth and investment in collaborative development will continue, resulting in these practices taking an increasingly important role in enterprise software development as Linux and open source have already done. They are now the de facto way to build software in the enterprise today; collaborative development is the next step in that evolution. Combined, open source software and collaborative development will enable business and technology innovation at an unprecedented, global industrial scale.

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Methodology

The Linux Foundation compiled this report as a result of its first invitation-only survey on collaborative software development practices. The survey was conducted in early March 2014. It surveyed both corporate and individual members of The Linux Foundation. Corporate members - including Platinum members Fujitsu, HP, NEC, Oracle, Qualcomm Innovation Center and Samsung - are already invested in Linux, open source and collaborative development and their experiences with Linux and open, collaborative development practices are leading indicators for what we can expect from the industry in the coming months and years.

This survey is not intended to be a comprehensive study of collaborative software development practices. We believe that the experiences of our members, many of whom are industry leaders on the cutting edge of software development, can help inform the industry and other companies as they consider increased investment in collaborative projects or explore new methods of software development. It is also important to note that people who are motivated to take a survey from The Linux Foundation should not be considered unbiased. But the size of these organizations, their buying power and technical prowess should provide important guidance for the industry.

In addition, Collaborative Projects are a new and growing segment of The Linux Foundation's core business, and so a portion of the survey sample already has some knowledge of and involvement in collaborative software development. We found that 43.2 percent of software developers and 76.1 percent of business managers in the survey indicated that they participate in Linux Foundation activities or collaborative projects.

The survey received 686 responses, including 519 who self-identified as software developers and 167 as business managers or executives. The majority of respondents (68.9 percent) work at organizations with $500 million or more in annual revenue and more than 500 employees (76.1 percent). Organizations with less than $5 million in annual revenue (14.9 percent) and 50 or fewer employees (14.2 percent) comprise the second largest survey segment. Those from the U.S. and Canada make up 42.6 percent, 24.9 percent are from Europe, 24.6 percent are from Asia, 3.2 percent from South America, 1.7% from the Middle East and Africa, and 2.9 percent from elsewhere.