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Linux Adoption Trends:
A Survey of Enterprise End Users

A Report By The Linux Foundation in Partnership
with Yeoman Technologies

October 2010

Executive Summary

Linux adoption in the enterprise has been accelerating for more than a decade, but details about its use among the world's largest enterprises are often underreported. Part of the complexity in tracking enterprise Linux use is that simple sales figures don't tell the real story. Companies can download software on their own, and Linux is not controlled (or marketed) by one vendor. A deeper look is required.

The Linux Foundation, in partnership with Yeoman Technology Group, recently conducted a survey of 1,948 Linux users. This invitation-only survey pool was comprised of The Linux Foundation End User Council as well as other companies, organizations and government agencies selected by The Linux Foundation and Yeoman.

This paper reports on the findings of that survey, with a focus on the 387 respondents who represent the largest enterprise companies and government agencies, identified as organizations with $500 million or more a year in revenues or greater than 500 employees. The results tell us where Linux is growing and why, as well as where opportunities exist and challenges remain.

In short, the survey found that Linux is poised for growth in the coming years; 76.4% of companies are planning to add more Linux servers in the next twelve months. In contrast, only 41.2% of respondents are planning to add Windows servers in the next year, while 43.6% say they will be decreasing or maintaining the number of Windows servers in their organizations over the same time period.

And over the next five years, 79.4% of respondents plan on adding more Linux, relative to other operating systems, compared to only 21.3% planning on adding more Microsoft servers in the same period.

Linux workloads are also changing, with 60.2% of respondents reporting that they plan to use Linux for more mission-critical workloads than they have in the past. Drivers for Linux adoption have also shifted; while conventional wisdom holds that cost was once the primary driver, this no longer seems to be the case. Technical superiority and security are among the top benefits cited.

Other interesting data brought to light by this survey and summarized in the following report include:

- Migrations to Linux from Windows are surpassing those from Unix, and 66% of users surveyed say that their Linux deployments are brand new ("greenfield") deployments. This greenfield market share grab is a good indicator of a platform's future performance.
- Cloud adoption is surprisingly low, with only 26% planning on moving applications/ services to the cloud in the coming 12 months. Not surprisingly, Linux dominates when moving to the cloud, with 70.3% using Linux as their primary cloud platform.
- 86.5% of respondents feel Linux continues to improve.
- The perception of Linux by management has shifted, with nearly 60% reporting that their CIO

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sees Linux as more strategic to the organization as compared to three years ago.

- These trends are leading companies to increasingly seek Linux IT professionals, with 38.3% of respondents citing a lack of Linux talent as one of their main concerns related to the platform.

Admittedly, The Linux Foundation End User Council and other enterprise end users who are motivated to complete a survey from The Linux Foundation are not an unbiased lot. But the organizations' size, buying power and technical backgrounds – as filtered by The Linux Foundation and Yeoman – certainly make this data worth noting, both for Linux vendors and developers, as well as for their competitors.

Linux Vendors Poised for Growth

Our survey results show that Linux use is growing in the enterprise and in many cases the growth is coming at Microsoft's expense. It also shows that Linux is the platform of choice for new application deployments and next-generation computing.

A full 79.4% of respondents report that they expect Linux use to increase compared to other operating systems over the next five years. In the next twelve months, 76.4% are planning to add Linux servers. At the same time, 43.6% of these organizations will decrease or hold steady on their number of Windows servers in the next year, while only 41.2% plan to add more.

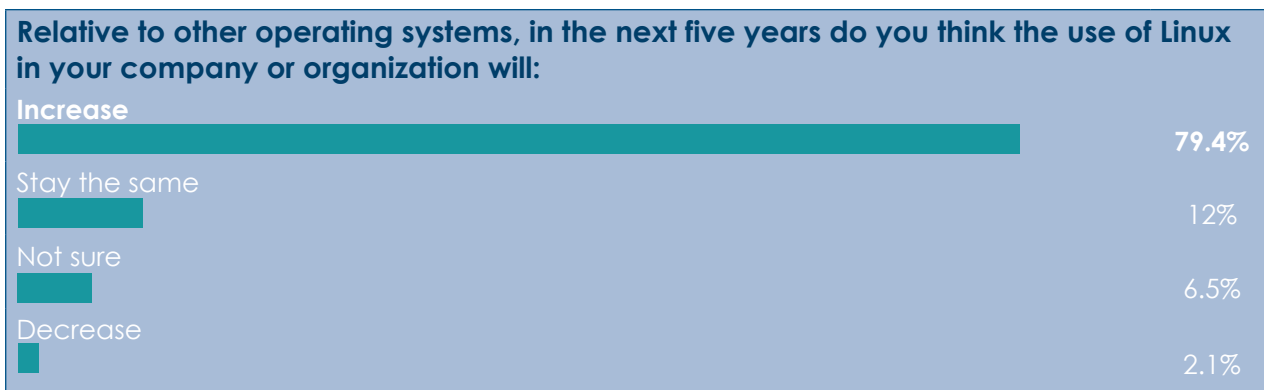**Relative to other operating systems, in the next five years do you think the use of Linux in your company or organization will:**

Increase	79.4%
Stay the same	12%
Not sure	6.5%
Decrease	2.1%

Chart 1

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In the next 12 months, what are your organization's (or division's) plans for:

0%　　　　20%　　　　40%　　　　60%　　　　80%　　　　100%

Linux

1.8%　　　　　　　　　76.4%　　　　　　　　　13.1%

Windows

18.1%　　　　　　41.2%　　　　　　25.5%

Unix

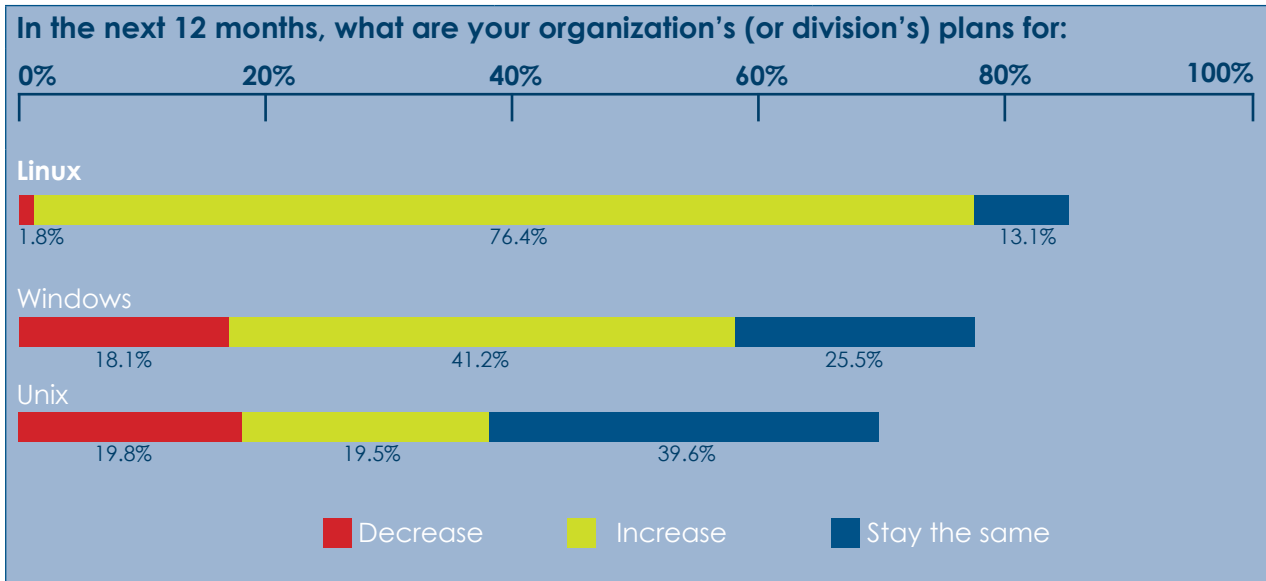19.8%　　　　19.5%　　　　39.6%

■ Decrease　　■ Increase　　■ Stay the same

Chart 2

When asked about new Linux deployments, respondents indicate that 66% are for brand new applications/services or "Greenfield" deployments. This is significant since users can choose any platform for new applications. Obviously Linux is a compelling option for new service deployments.

For migrations to Linux from other platforms, we were surprised to find that migrations from Windows (36.6%) are surpassing the number of migrations from Unix (31.4%), even though this information runs counter to much of the data released in the market.
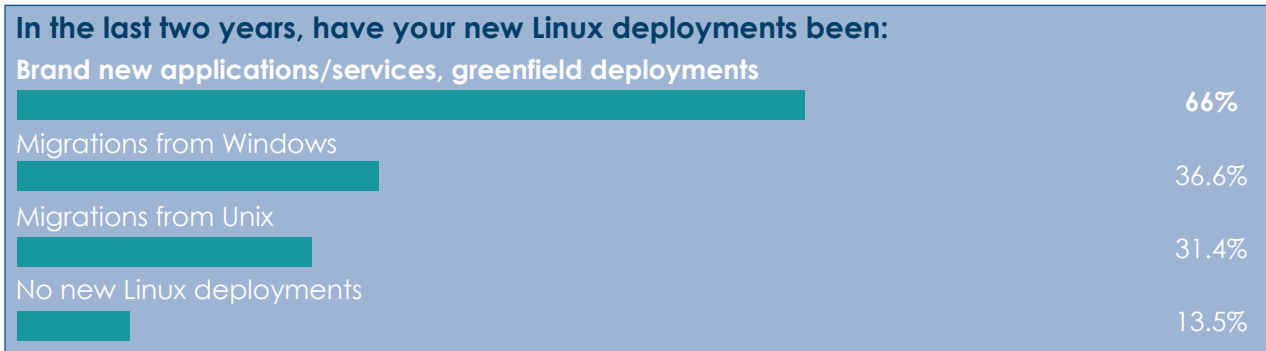
In the last two years, have your new Linux deployments been:

Brand new applications/services, greenfield deployments

　　　　　　　　　　　　　　　66%

Migrations from Windows

　　　　　36.6%

Migrations from Unix

　　　　31.4%

No new Linux deployments

　　13.5%

Chart 3

Even more telling? More than 60% of respondents report that they plan to increase their use of Linux for mission-critical workloads.

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Relative to other operating systems, how would you describe your planned use of Linux for mission-critical workloads over the next 12 months?

We will be using Linux for more mission-critical workloads

60.2%

We will not be increasing or decreasing our use of Linux for mission-critical workloads

23.5%

Not sure

12.4%

We will be using Linux for fewer mission-critical workloads

3.9%

Chart 4

Changing Drivers of Linux Adoption

What are the real decision factors that are driving Linux adoption? Features and technical superiority top the list. And as you can see from the results, these are closely followed by lower TCO and security. Rounding out the middle are available in-house talent, lack of vendor lock-in, openness and ability to modify code and the long-term viability of the solution.

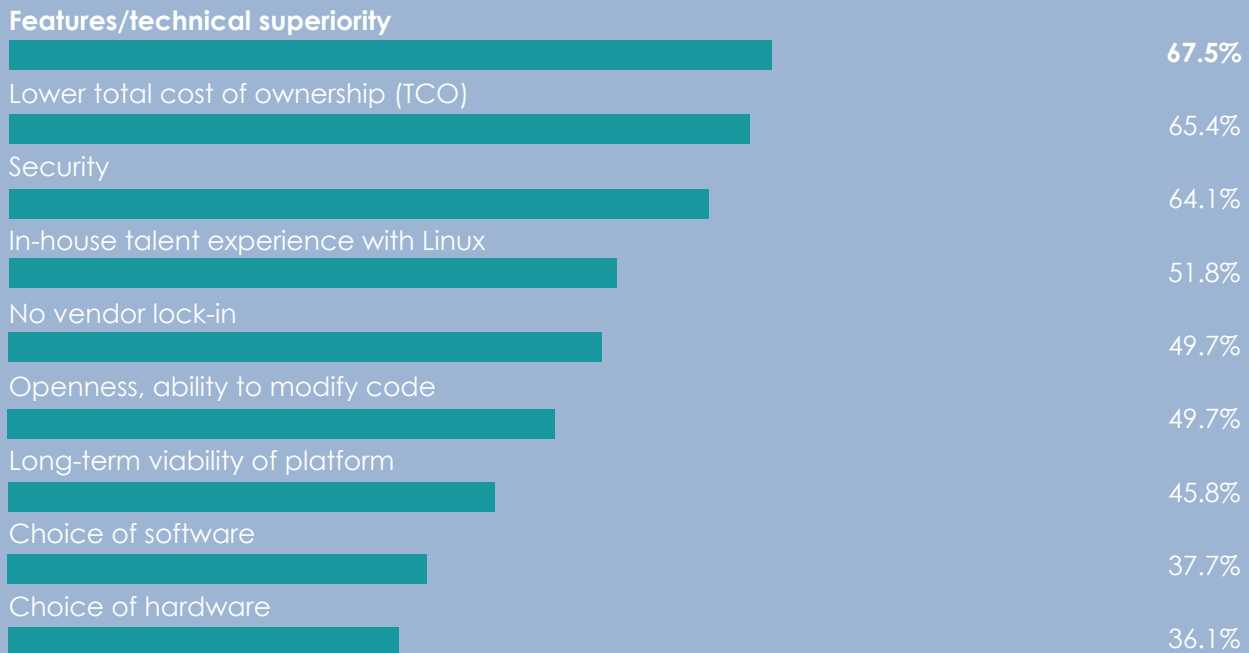**What are your drivers for adopting Linux?**

Features/technical superiority

67.5%

Lower total cost of ownership (TCO)

65.4%

Security

64.1%

In-house talent experience with Linux

51.8%

No vendor lock-in

49.7%

Openness, ability to modify code

49.7%

Long-term viability of platform

45.8%

Choice of software

37.7%

Choice of hardware

36.1%

Chart 5

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Of those who selected other reasons for adoption, some of the comments include:

> *"Linux is the only real choice for high performance computing at the current time. Although other operating systems have products available for high performance computing, they just don't measure up."*

> *"Freedom, I like to modify and customize my own system and programs."*

> *"The super flexibility of Linux tells it all."*

> *"Stability, no viruses."*

> *"Low cost hardware, security from virus or hacking."*

> *"Reliability - most of our heavy duty production Linux servers have an uptime approaching 1500 days."*

We believe this data represents a shift in the purchasing and deployment behaviors of Linux users. Where Linux adoption in the first phase of the Linux build-out centered on cost savings, that no longer appears to be the main driver. As Linux has matured technically, users are now basing their decisions on its technical superiority relative to other platforms. However, it is to be noted that cost certainly is still a factor, with one respondent saying: *"Our company is doing away with per-seat software licenses, so Linux is obviously a natural fit for us."*

How The Recession Has – And Has Not -- Played a Part

While TCO has moved from the primary to secondary adoption driver, it would be hard to talk about any IT trend in the enterprise without talking about the impact of the recent downturn in the economy. In this survey, 40.4% of respondents feel that the recession has caused their enterprise to increase its Linux use. Perhaps surprisingly, though, 58.6% say the recession has had not had an impact on their use of Linux.
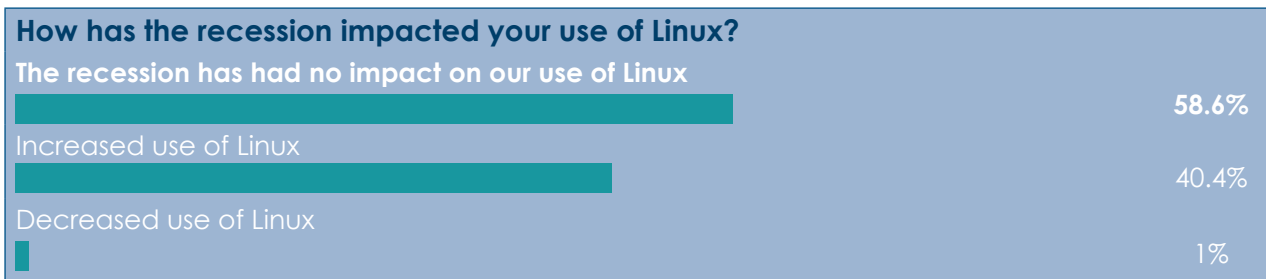
How has the recession impacted your use of Linux?

The recession has had no impact on our use of Linux	58.6%
Increased use of Linux	40.4%
Decreased use of Linux	1%

Chart 6

Most of the users who increased usage due to the economy pointed out key features like the *"ability to use less hardware to accomplish the same goals,"* the fact that *"Linux has a lower cost of ownership than other OS options,"* and that customers are driving Linux adoption as they are *"looking for opportunities to use more open source/Linux-compatible products."*

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One respondent made a point of telling us that the level of IT workers' expertise has increased in the last few years to the point where *"training staff [on Linux] has proven to be more cost-effective than purchasing licenses."*

Just as interesting are the comments from those who didn't feel the economy changed their Linux plans. Those respondents had also increased usage, although the reasons were more focused on reducing complexity and a bigger overall technology framework that leveraged the Linux platform. One respondent put it very succinctly: *"Our strategy has been towards Linux for many years. The recession didn't change that."*

Linux Leads in the Impending Cloud

We were most surprised to see that the majority of respondents report that they are not actively using cloud computing, and 40.1% said they had no plans to do so in the next twelve months. It appears that, at least for now, the cloud may be more hype than reality, at least with very large enterprise users.
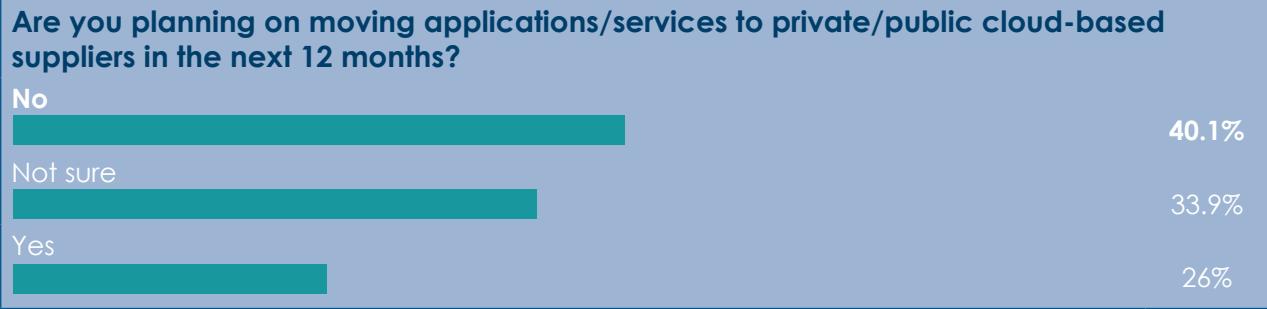
Are you planning on moving applications/services to private/public cloud-based suppliers in the next 12 months?

No	**40.1%**
Not sure	33.9%
Yes	26%

Chart 7

That said, of those who are in the cloud, 70.3% use Linux as their primary platform, while only 18.3% use Windows.

If you use cloud-based providers or if you are running your own private cloud, what is/are the PRIMARY platform(s) you use to run them?

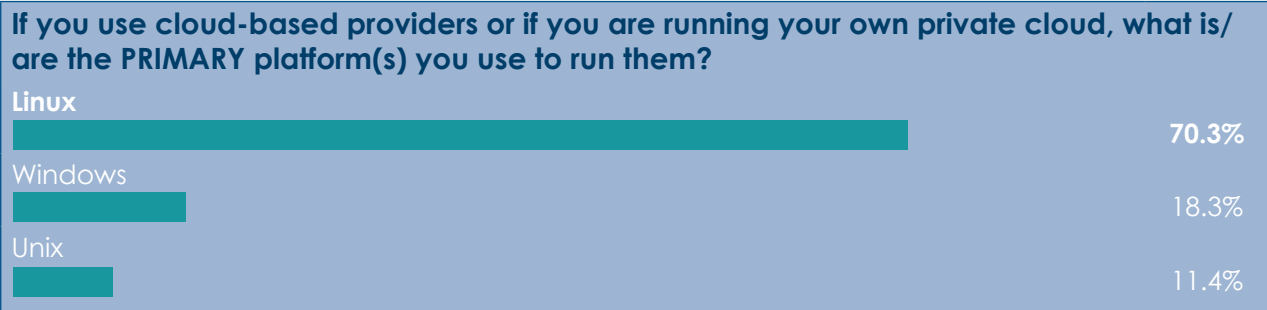|	
Linux	**70.3%**
Windows	18.3%
Unix	11.4%

Chart 8

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Perception of Linux Is Improving throughout the Organization

The first step to widespread adoption is winning the hearts and minds of the technical teams who will be using it every day. The data captured in the survey about quality and stability show that battle is won: an eye-popping 86.5% of respondents say that they believe Linux continues to improve as an operating system. Furthermore, 58.4% believe that management has started to see Linux as "more strategic to the organization" over the last three years.
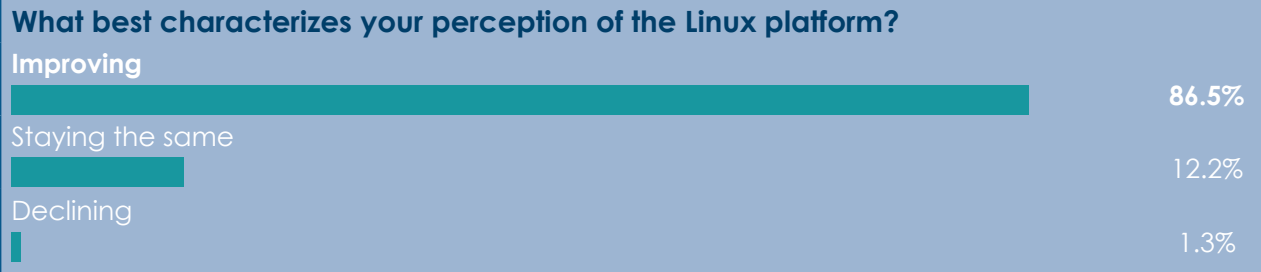
What best characterizes your perception of the Linux platform?

Improving	**86.5%**
Staying the same	12.2%
Declining	1.3%

Chart 9

How has your CIO or management's view of Linux changed in the last 3 years?

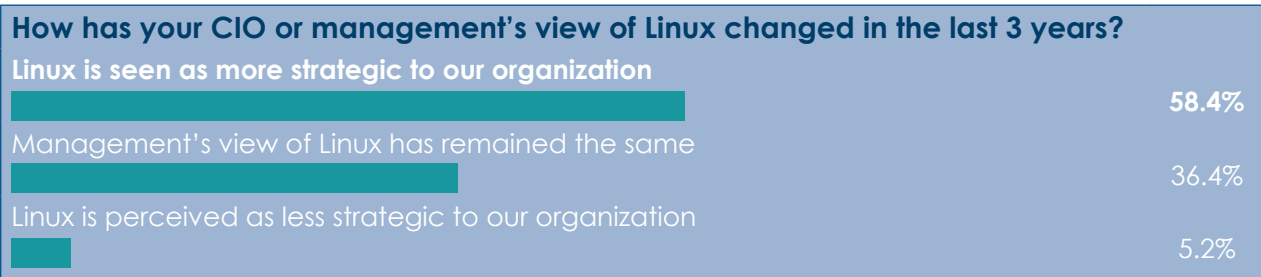|	
Linux is seen as more strategic to our organization	**58.4%**
Management's view of Linux has remained the same	36.4%
Linux is perceived as less strategic to our organization	5.2%

Chart 10

Linux and Desktop Adoption

A rather interesting surprise was the relatively large number of organizations that cited some level of desktop Linux in their companies. 36.3% report they are currently using it, with another 11.5% evaluating or planning deployments over the next year. Many respondents cited small, specialized uses, but a few noted more than 400 deployments underway with at least one citing an 8,000 desktop target.

While Linux for everyday knowledge workers still isn't a widespread option on the desktop, developers sure are using it. Linux as a platform for development is taking off and developers are always early adopters who will eventually push adoption up through the enterprise.

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Obstacles to Linux Adoption

When asked what factors are impeding Linux adoption, overall concerns are relatively low, but the biggest concerns center on driver availability, interoperability with other systems and finding Linux talent.
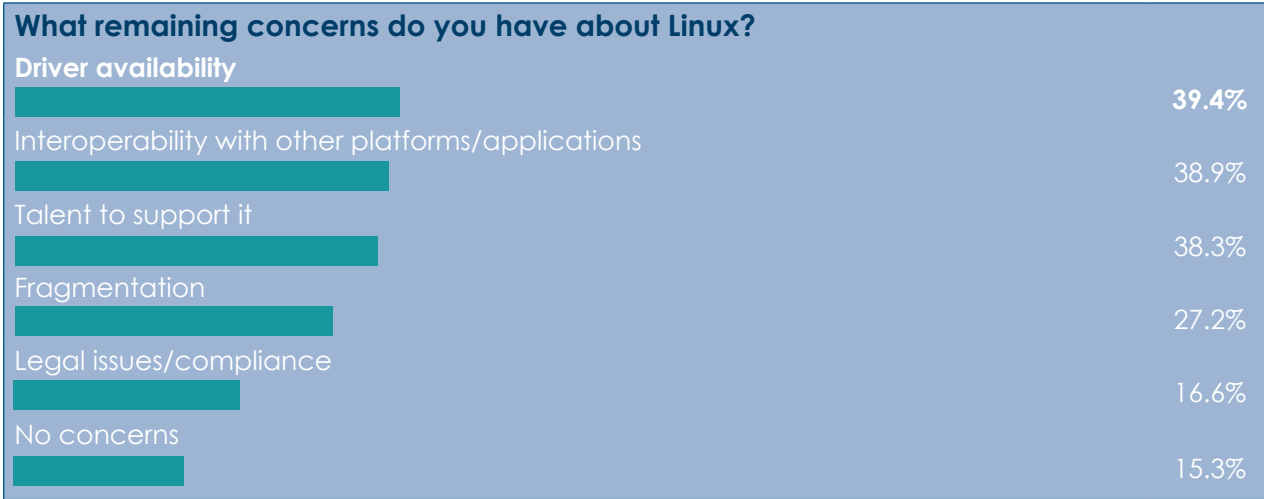
What remaining concerns do you have about Linux?

Concern	Percentage
Driver availability	**39.4%**
Interoperability with other platforms/applications	38.9%
Talent to support it	38.3%
Fragmentation	27.2%
Legal issues/compliance	16.6%
No concerns	15.3%

Chart 11

Getting Over the Bad Reputation of Poor Driver Availability

Linux has long suffered from a reputation of not having enough drivers, and 39.4% of respondents cite lack of driver availability as a "concern" about Linux. However, we feel this is more of an education and perception issue. The Linux kernel currently includes drivers for everything from servers to storage arrays. The Linux Driver Project has over 200 open source developers who actively develop and maintain open source drivers in Linux, and almost all holdouts to Linux driver support have now released Linux drivers, including Broadcom, in the last kernel.

Linux Talent

Is Linux the victim of its own success? As we have seen from the survey results, Linux is experiencing significant growth in every category of computing. At this critical point, a shortage of qualified people to support this ecosystem is becoming an issue. It's not a drought, but it is a concern for over 1/3 of the respondents.

This is consistent with data reported by the JobThread Network earlier this year. The online recruitment platform said that the demand for Linux-related jobs has grown 80% since 2005, demonstrating that Linux professionals represent the fastest growing job category in the IT industry. This indicates something about the growth of Linux but also reveals some of the growing pains.

The demand for Linux talent is not a short-term trend and, based on recent data, is counter to current unemployment rates.

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The Linux Foundation and its members have made a strategic decision to address this increase in demand for Linux professionals with significant training and educational resources, including the Linux Training Program (training.linuxfoundation.org) and developer training at events like LinuxCon throughout the world.

How Linux Users Participate

Our survey respondents do not report extremely active developer participation in the Linux community, with only 13.4% saying that they actively contribute code. While these enterprise users may not contribute code directly to the kernel or other foundational upstream projects, they do participate in the community by testing and submitting bugs (37.5%) and participating in important Linux Foundation programs such as the End User Council (26.9%).
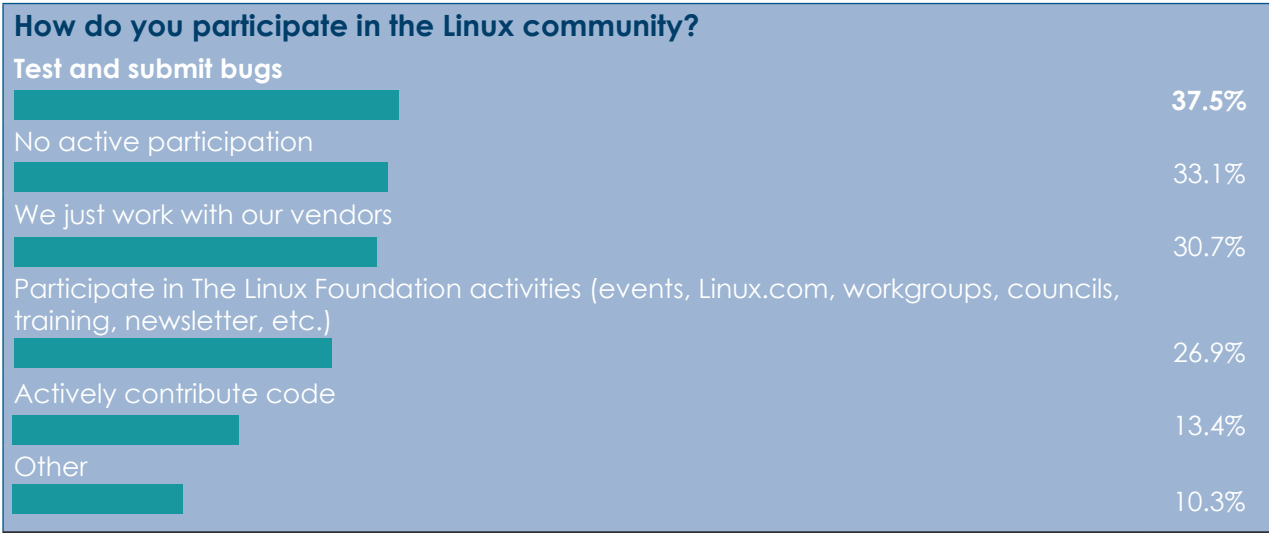
How do you participate in the Linux community?

Test and submit bugs	**37.5%**
No active participation	33.1%
We just work with our vendors	30.7%
Participate in The Linux Foundation activities (events, Linux.com, workgroups, councils, training, newsletter, etc.)	26.9%
Actively contribute code	13.4%
Other	10.3%

Chart 12

The data bears out that The Linux Foundation has become an important resource for end users who are seeking a neutral forum in which to participate with the Linux community. Exclusive events and The Linux Foundation's End User Council offer unique opportunities to collaborate with the community in a neutral and intimate environment.

The Bottom Line

Since technology purchases are about the future as much as the present, the research findings bode extremely well for Linux. As the community works to iron out the last few kinks in the system and shed some outdated misconceptions, Linux vendors should be poised for growth in the coming years as the survey results indicate that the platform is enjoying positive momentum, perception and adoption among the world's largest enterprise users.

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Overall, responses indicate that once enterprises deploy Linux, they stick with Linux and plan to add more Linux – not because of lock-in, but rather because the platform provides sustainable benefits that include a broad feature set, security, cost-savings and flexibility. It also supports the next generation of computing and is the platform for the cloud.

About Our Respondents

The results of this survey were based on responses from 387 IT professionals from organizations with $500m or more a year in revenues or 500+ employees. The vast majority (60.5%) identified themselves as IT/IS staff or developers and represented a wide range of industries. 46.5% are from the US and Canada, 28.7% are from Europe, and 11.6% are from Asia.

This survey was conducted with members of The Linux Foundation's End User Council, as well as other end users identified by The Linux Foundation and Yeoman Technologies. This report is being published at The Linux Foundation End User Summit, where many respondents will be in attendance. These companies include Morgan Stanley, Goldman Sachs, Bank of America, Bristol-Myers Squibb, NTT, Deutsche Bank, Dreamworks, ADP, McKinsey and Company, Bank of New York, Barclays Capital, AIG, the US Department of Defense, MetLife, CME Group, NASDAQ QMX, the New York Stock Exchange, Goodrich, and many more.

The End User Council is a neutral forum for corporate end users to voice platform concerns, discuss best practices on Linux deployments, and identify common technical requirements that can be shared with The Linux Foundation Technical Advisory Board and the Vendor Advisory Council.

By participating in Linux Foundation events and frequently meeting with the Technical and Vendor Advisory Boards, the End User Council promotes understanding of how Linux is -- and will be -- used in many of the world's most demanding environments.

The organized collaboration among these three constituents aggregates and streamlines communication of key issues facing the platform now and in the future, strengthening Linux for all.

The End User Council is led by Vinod Kutty, Associate Director at CME Group. More information on the council, including how to get involved, can be found at http://www.linuxfoundation.org/programs/advisory-councils/euc

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