We dedicate this report to our rebel alliance, the tens of thousands of people around the globe who believe in Mozilla, and who contribute their time, insights and creativity to helping us succeed in our mission. We also dedicate this report to the tens of millions of people who use our products and services, and who by doing so support our work to ensure every person’s digital life is safe, secure, and empowered on an open and accessible Internet.
Understanding the Rebel Alliance

New network graphs show the breadth, dynamism, and interconnectedness of Mozilla's communities. These kaleidoscopic visualizations of Mozilla's communities also show how they differ in focus, numbers and volume. Again, these don't include the thousands of participants whose support isn't registered in a contribution system! The report makes clear that non-employee contributors continue to help Mozilla across a wide range of our business and mission, from answering support questions on Twitter to documenting new web technologies, localizing web content, and identifying problems in our open source products.

This report brings a more sophisticated understanding of our communities that could drive new pragmatic investments in contribution programs. For example, knowing our community members identify over half of all regression bugs in Firefox, Gecko, and Developer Tools* (and at a high rate of quality), how might we better incentivize such contributions? As another example, a remarkably high number of people in our survey signed up to participate but didn't follow through. Most cited that they just got busy, but many also didn't know how to start or what to do. How might we improve the contribution experience to better lead potential contributors from interest to participation? Open source development is just one of many ways volunteers contribute to Mozilla. Indeed, at least by our survey results, it's not the primary area of participation. That's reserved for events, such as workshops on IOT and localization meetups. Still, open source is enshrined in our mission, and it's at the heart of our rebel alliance. Despite being central to our culture, workflows, and relationships, Mozilla hasn't had a way of evaluating how well our co-development communities are functioning. We're not alone in this problem. The report relies on recent research to present a vision for how Mozilla could better conceptualize and track open source community health* and applies some of these metrics to our main open source projects.

Lastly, it's important to note what isn't captured here: the value of social connections, the learning and the mutual support people find in our communities—staff and non-employees alike. These intangibles are hard to quantify, but they're the essence of Mozilla's communities of builders and makers and dreamers.

When we shipped Firefox 1.0, none could have guessed there would be such passion and generosity from so many contributors around the world. We are grateful. It motivates us to fight even harder for everyone to have the safe, secure, and empowering digital life they deserve. The challenges around the state of the internet are daunting: disinformation, algorithms bias and discrimination, market consolidation and weak competition, and hate speech and online bullying. But with the creativity and strength we gain from our contributor communities, we're up for the fight.

See an interactive network view of Mozilla's contributor communities
https://report.mozilla.community
This report focuses largely on the contributor communities associated with the Mozilla Corporation, the maker of the Firefox family of products and a broad range of open source technologies that help keep the web open. However, much of Mozilla's community engagement is also led by the Mozilla Foundation, which is the sole shareholder in the Mozilla Corporation. The Foundation focuses on funding a broad, global movement for a healthier internet by working with communities around the world — such as digital rights organizations, policy groups, and privacy activists in Latin America — that share Mozilla’s principles and ambitions for a more human-centered internet.

With the infrastructure and capabilities we’ve set up through this research, we expect that future reports on Mozilla’s rebel alliance will be better able to give a more holistic view of Mozilla’s contributor communities, including the Foundation’s community-focused efforts. Still, this report does describe several of the Foundation’s key expert networks and community building programs — the Mozilla Developers and Academia — as well as the annual Internet Health Report and Mozilla Festival.

Please see the Rebel Alliance of Experts, Influencers, and Students section for more details.

This report takes a high-level view of contributor engagement, with a focus on describing the network and set of communities that function as an ecosystem around Mozilla. In some cases, Mozilla employee contributions are included in the analyses, such as to highlight contrasts. These instances are clearly marked. Otherwise, the analyses include only non-employee contributors.* This report also tells an incomplete story about the value of Mozilla contributions. Moreover, as we openly call for and rely upon contributions of all kinds, we don’t claim that one type of contribution is more valuable than another. In describing the contributor communities and segments and how they are networked, this report counts code commits the same as comments or issues.

These analyses are based on contribution data from five different contributor platforms: GitHub/Git, Bugzilla, Kitsune (Support), Pontoons (Localization), Kuma (Mozilla Developer Network), and the Add-ons database. Note that the Common Voice contribution data for all analyses are for only for code contribution to GitHub/Git and localization contributions, except where noted in the section specific to the Common Voice project. Also included are insights from a qualitative survey of contributors conducted between April and May 2019.

Contribution data from Firefox OS, a large, multi-year effort to build a mobile operating system based on web technologies that was cancelled in 2016, is not included in the quantitative results here. While Firefox OS proved effective at mobilizing contribution, as a special investment, that data represents an outlier when drawing historical trends from Mozilla’s current portfolio of products and technologies. Accordingly, Firefox OS data is only included in the survey results in the context of past contributions.

Additionally, we now there are some inaccuracies in the data. For example, we are aware that we did not include the full set of repositories related to Firefox for Android. Please see the appendix section on data reliability for more information.

* Note that SUMO analytics do not include Twitter data through the Reply by Riffle application. We were unable to include that new data source. SUMO stands for Support Mozilla.org.

Several high level questions came to mind to the authors and editors of the report, including:

- How can we better support our community members in their personal goals?
- Can we recognize when a community member is running into problems that hinder further engagement?
- Are there effective, scalable interventions in these cases?
- Can we identify a new contributor who is likely to engage across multiple projects?
- How can we better support our community members in their personal goals?

These are just some of the questions we pose throughout and hope to begin answering within this report.

Have questions or suggestions? Please connect with us at rebelalliancereport@mozilla.com

More details on the report’s methodology, definitions, and additional notes of caution are in the Appendix.

Definitions
Visualising the Rebel Alliance

Network visualization of Mozilla and the Rebel Alliance by project activity (2017-2019)

Each node (circle) represents a single contributor, and the edges (lines) represent contributions from participants to different Mozilla projects. Each contributor is color-coded by the project to which they most frequently contribute.

Project proximity relates to contributor overlap, meaning projects in the center of the network have a higher share of contributors who participate in the projects placed close to them. As in the case with Firefox Android and Firefox iOS, Add-ons and Web Properties contributors are generally very central in the network, meaning they contribute to many other projects as well.

Some of the big projects (larger labels) are at the periphery since they have a whole community of contributors who only participate in these specific projects (e.g. Firefox, Thunderbird, MDN, Rust). Note that for the network graphs, most Localization and SUMO contributions are actually visually represented with their respective product or service. For example, SUMO responses related to Firefox are represented in the Firefox node, rather than the SUMO node (Firefox for Windows & Touch is the only one not mapped to a project). The Localization and SUMO nodes on the network graphs represent GitHub/Git related data only.

Core contributors participate in an average of 4.3 projects

For the first time, we’re able to visualize the network structure of Mozilla’s rebel alliance of contributors by mapping individual contributors per project, based on data from our main contribution platforms. This network graph reflects non-employee contributor engagement between 2017 and 2019, but does not include any contributor that has made less than 5 contributions over their lifetime.∗

The smaller communities in the center include a large group of core contributors. On average, each core contributor participates in 4.3 projects. Mozilla contributors also tend to be active in larger projects on the periphery, making them important bridges across communities.

This network lens demonstrates several key aspects of the state of Mozilla’s contributor communities:

• Mozilla has several well-defined contributor communities clustered around products and other areas of contribution, like localization and support.
• Mozilla’s largest communities have thousands of participants who only contribute to that project.
• There is strong cross-contribution between products such as Firefox and Thunderbird, Firefox and Gecko, Firefox and Firefox Android, and Rust and Servo. There’s also notable overlap between Common Voice and Deep Speech, Infrastructure and Gecko, Web Properties and Firefox, and Firefox Focus and Localization. These overlaps show there is a set of contributors—offering both code and non-code contributions—motivated to contribute to multiple projects across Mozilla.

### FOR FURTHER RESEARCH

• Which contributor communities act as the biggest ‘onramps’ to participation across multiple projects?
• What causes contributors to participate in multiple Mozilla projects?
• What do we know about the ‘lifecycle’ of non-staff contributors?
• What can we understand from looking at the social connectedness and links between projects?

* We define this group as the ‘visitor’ segment.
** Please see the Appendix for definitions of Web Properties and Infrastructure.
Overall View of Contribution

As the graphs here show, 2009 was an inflection point for Mozilla in engaging non-employee contributors. Overall contributor numbers rose rapidly after 2009, coinciding with the launch of new projects like Rust and WebVR. Excluding localization data from the Pontoon contribution platform, in which changes in 2014 significantly skewed results upward, contribution volume from non-employees and staff has risen at a similar pace since 2009. Notably, on average, employees contribute more than 12 times the volume of contributions as their non-staff counterparts.

In 2018, 52% of all contributions to Mozilla were from community members (again excluding Pontoon). Contributions include everything from code commits and pull requests to revisions of MDN articles and answering support questions.

However, tracking and analyzing contribution volumes is only one step towards understanding the health, attractiveness, and impact of Mozilla’s contributor communities. This generic view doesn’t provide insight into community dynamics, motivations, productivity, quality or mutually shared values, and should not be taken to mean that only numbers of people and the volume of their contributions matter.

With that strong caveat, this data analysis does provide a useful overall picture. Non-employee engagement and contribution volumes are a proxy for public support of our mission, our message, and our product vision. Any decline in community engagement in the face of new projects and Mozilla investments would certainly indicate a problem. When we break these overall numbers down by contribution platform and project later in this report, there are no significant dips or big surprises from any of our main areas of participation.

Although we don’t analyze measurable value and impact of these non-employee contributions, this quantitative analysis signals their significance to Mozilla’s mission and market success.

For further research:
- What is a productive and sustainable ratio of non-employee to employee contributors?
- How can we make this type of determination?

Non-employee contributors continue to grow...

After peaking in 2014, contribution volume is now relatively stable. However, the average contribution volume per staff member was 12 times higher than that of non-staff contributors in 2018.

52% of all contributions to Mozilla in 2018 were from community members.
Mozilla has traditionally conceived of our contributor communities as being powered by individual volunteers who are largely motivated by Mozilla’s mission. However, our products, technologies, and mission bring value to commercial organizations as well. Fostering co-development and collaboration with these commercially-vested contributors – even those with whom we have significant differences of opinion or with whom we compete – can increase our market and mission impact.

Here, we evaluate commercial contribution to Mozilla across all platforms with a specific focus on contribution from the 28 commercial organizations identified in 2018 as having particular strategic value to Mozilla.

We’ve identified 1,268 contributors from these companies, with the top ten commercial contributor organizations being:

<table>
<thead>
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<th>Company</th>
<th>Number of Contributors</th>
</tr>
</thead>
<tbody>
<tr>
<td>google.com</td>
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<tr>
<td>microsoft.com</td>
<td>166</td>
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<tr>
<td>oracle.com</td>
<td>123</td>
</tr>
<tr>
<td>cisco.com</td>
<td>92</td>
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<td>yandex.com</td>
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<td>hp.com</td>
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<td>apple.com</td>
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<tr>
<td>fb.com</td>
<td>45</td>
</tr>
<tr>
<td>amazon.com</td>
<td>27</td>
</tr>
<tr>
<td>dell.com</td>
<td>16</td>
</tr>
</tbody>
</table>

Mozilla’s GitHub/Git repositories were by far the biggest destination for these contributions, with 68% of all volume by these key commercial organizations. The top five projects for contribution were Gecko (26,576), Quality Assurance (20,230), Mozilla Developer Network (13,925), Rust (7,463) and Firefox (5,525).

Google leads commercial contribution, with almost double the combined volume of Microsoft, Oracle, Apple, and Facebook. However, commercial contribution has been declining since 2015.
Commercial Contribution to Firefox and Gecko

Contrary to the overall view, code-focused contribution to Gecko and Firefox from commercial partners has been rising, after a spike and fall around 2015. Contributor numbers have also grown, landing at 151 in 2018.

Google contributes dramatically more to Firefox and Gecko through GitHub/Git and Bugzilla than other commercial contributors and was largely responsible for the 2015 and 2018 spikes.

Mozilla’s External Network Influence

The rebel alliance of Mozilla contributors helps us influence the industry, share our expertise and learn from more diverse views, and align upstream dependencies and encourage downstream adoption. Evaluating the full breadth and reach of all Mozilla’s contributor communities is too challenging an endeavor, but it would be useful to better understand the specific ecosystems in which our open source communities function. In our contributor survey, 56% of active participants said they participate in other free and open-source software (FOSS) projects—an increase from 43% in 2017. Our contributors’ active participation in other FOSS initiatives suggests interconnectivity with peer projects and potential areas for greater collaboration and partnerships. Indeed, this interconnectedness can help us better understand technology embeddedness, fork and spin-off opportunities, and upstream dependencies, all of which are core to an ecosystems-focused understanding of Mozilla’s open source health.

We’ve only just begun to scratch the surface of a network view of Mozilla and other projects as defined by GitHub/Git data. Combined with our standards activities and the expert advocacy networks built through the work of the Mozilla Foundation and the Mozilla Fellows program, research grants, and awards programs, we are just beginning to map the full influence and capacity of the rebel alliance.
The Rebel Alliance around Mozilla has strong connections to other open source communities, as defined by contribution across repositories, with the highest volume of connections related to Web technologies and web development tools, followed by the Rust ecosystem and related individual projects.

Unsurprisingly, most connections between Mozilla’s open source work and the broader open source ecosystem are around web technologies, frameworks, and tools, such as node.js, react, and angular; Atom and Electron; and Visual Studio Code.

Microsoft, Google and Facebook manage the open source repositories with the highest numbers of Mozilla non-employee contributors.

About 1,000 non-employee Mozilla contributors have also contributed to Microsoft-related open source projects, closely followed by Google and Facebook, with 685 and 662 respectively. Node, Homebrew, npm, W3C and GitHub/Git also stand out, along with a few individual owners who maintain Rust-related open source projects.

For further research:

- Can we describe our rebel alliance in terms of adoption of Mozilla’s technology into other projects, such as Rust and AV1?
- Can we describe our rebel alliance in terms of upstream dependencies on other open source projects?
All Mozilla contribution platforms and communities are experiencing growth, except Bugzilla (registered bugs), which is flattening out. The peak in Kitsune (Support) was driven by non-staff activity on Twitter.

Kitsune stands out as the most isolated platform, indicating a specialization in support, while non-employee contributors to Kuma (MDN) are the most likely to contribute through other platforms.

The table shows the share of contributors active on one platform who are also active on other platforms (column share).

The previous overlap matrix shows some interesting traits about Mozilla’s various platforms and communities. For example, 73 percent of Pontoon (localization) contributors are also active on Git/GitHub. Furthermore, 29% of Git/GitHub contributors are also present in Bugzilla. AMO and Kitsune contributors tend to contribute in a more isolated manner to their respective platforms. It’s interesting to note that the Kitsune platform appears to have the smallest percentage of overlap with other contribution platforms.

Note that this report does not analyze non-employee code contribution to the open sourced contribution platforms we maintain, such as for Kuma (MDN), Kitsune (Support), and AMO (Add-ons). Code contribution to these platforms is included in our overall look at GitHub/Git contribution. Future reports should consider looking more specifically at these repositories and other areas that comprise Mozilla’s technical infrastructure.
Overall non-employee Bugzilla contributor numbers have been declining. New non-employee contributors to Bugzilla were at their highest in 2002 (1,808), but only 413 new contributors joined last year. However, one-year contributor retention remains relatively steady across time, landing at 42% last year down from a high of 53% in 2008, suggesting that the problem lies more in attraction rather than retention.

Bugzilla contribution volume has had peaks and valleys, with those from Mozilla staff generally following the non-staff pattern until a significant upwards break by staff in 2009, with a peak variation in 2014. Since then, staff and non-staff contribution have both dropped, but that volume differentiation has remained stable. Bug contributions in Bugzilla are dropping.

Bugzilla contributor numbers have declined gradually since 2014. The share of employees has remained steady at around 30% from 2013-2018.

Looking exclusively at Bugzilla bug filing and GitHub/Git issue filing volume for Firefox and Gecko, we see that Bugzilla is still the main platform for filing bugs. After its deployment in 2010, GitHub/Git saw an increase of issues for Firefox and Gecko year over year, peaking in 2017 with 3,017 registered issues. Still, GitHub/Git does not seem to have taken over the main share of filed bugs. This historical view seems to indicate that registration of Firefox and Gecko bugs and issues on the respective platforms has been flattening out in the past few years. It’s too early to tell if the year-over-year decline between 2017 and 2018 is the first sign of an ongoing trend or an isolated event.

Again, for a more complete view of contribution to Firefox and Gecko, please see the Open Source Health section.

Some flattening of bugs and issues registered to Gecko and Firefox after years of steady increases

FOR FURTHER RESEARCH
• What can we learn from comments within Bugzilla? Might this inform our understanding of social connectedness?
• How might we analyze non-employee contribution to Bugzilla in terms of value? For example, how many of the bugs submitted by non-employees end up being triaged as “need to fix”?
• What’s behind the decrease in bug filing for Firefox and Gecko, and does this mean anything to product quality and user retention?
• Survey data seems to indicate that many people sign up to participate but don’t actually make a contribution. Is this the case for Firefox/Gecko and bug identification in Bugzilla?
• How do we identify contributors that take on the most difficult bug fixes?
For this report, the Firefox engineering team requested that we examine the role of non-employees in identifying regression bugs. A regression is a bug that makes a feature stop working after a recent patch or update, and they are defined in the bug’s keyword.

Finding and filing regression bugs helps Mozilla continue delivering dependable, high-quality software. With Firefox release engineering moving from a six to four-week release cycle, identifying and resolving bugs is even more important. Rapid turn-round on regression bug fixes also impacts browser retention rates and usage.

Interestingly, when compared to filing of all bugs in Bugzilla, community filing of regression bugs outpaces employee contribution and has remained steady and significant over time.

Almost eleven thousand non-employee contributors filed regression bugs between 2000 and 2018. Though far more limited in numbers, staff members tend to be much more productive contributors, filing an average of six to seven bugs per individual compared to the 2.5 bugs per non-employee contributor. It’s notable that there are relatively few non-employee contributors to MDN who also file regression bugs. One would expect more engagement from this web developer crowd.

Promisingly, more than half of all non-employee regression bugs are validated and fixed. Still, bugs filed by community members have a higher chance of being dismissed. This could be due to problems in the contribution experience or even bias. For example, might bugs from non-native English speakers be treated differently?

There is a notably low percentage of WONTFIX bugs from non-employee contributors—less than from staff—suggesting that non-employee contributors aren’t asking for features we’ve removed. This could be confirmed in the future by understanding how WONTFIX bugs break down into the categories of task, enhancement, and defect.

Looking at regression bugs opened and closed in the same year, those from non-employees closed on average 9% faster than those from non-employees (43.6 versus 39.5 days). The share of bugs closed in the same year they were opened has steadily risen since 2010, with a negligible difference between staff and community recently, suggesting a well functioning workflow.
The overall efficiency of regression bug closures is improving for both community and staff.

![Graph showing the share of bugs being closed the same year they were opened.]

Note: This analysis only includes regression bugs marked as resolved.

In contrast to Bugzilla, the number of both employee and non-employee contributors to GitHub/Git has steadily increased since 2011, with the number of staff contributors remaining stable at around 900 contributors between 2013 and 2018.

GitHub/Git is one of the rare platforms for which cumulative employee contributions far outweigh contributions from the broader community, with 62 percent of all contributions attributable to employees.

Mozilla’s open source projects are now mainly co-developed through GitHub/Git, where staff dominate contributions.

The growth in commits across our projects far outweighs the growth of issues and pull requests.

Despite the rise in contributor numbers, there was a 6% dip in overall contributions to GitHub/Git between 2017 and 2018. This reduction is attributable solely to employees, as community contributions actually rose over the same time period. This is a small reduction, and it’s too early to say if projects are stabilizing in terms of contribution volumes. Projects that experienced a fall in contributions include: Servo (40%), Localization (28%), Firefox (27%), Web Properties (14%) and Gecko (13%).

Our analyses show that contribution volume to Bugzilla is decreasing while contribution volume to Gecko and Firefox is increasing. This could be due to the structure of GitHub/Git, in which contributors work on different branches and forks where issues can be filed, and commits are counted when they are merged into the main branch.

### FOR FURTHER RESEARCH

- What is the distribution of resolutions of non-employee filed regressions?
- How might we better engage non-employee contributors around regression bugs?
- How might we better activate our MDN developer community around filing regression bugs?
- How does bias impact the bug fix process, and how might this impact any automated triage work?
Strong growth for the community that revises articles for MDN, the premier digital resource on open web technologies

Non-employee MDN contributors have grown, with a leap in 2011 that peaked in 2017. Contribution numbers likely track to web site traffic, which doubled between 2016 and 2019. The dip and plateau around 2016 is attributed to a spam problem, which meant we couldn’t accept new contributors. However, the more recent dip should be monitored, although some is likely contribution from browser compatibility data editing moving to GitHub/Git.

Non-employee growth has been driven by a combination of new non-staff contributors and solid retention rates that have generally stable, with a peak of 400 in 2017. Non-employee growth has been driven by a combination of new non-staff contributors and solid retention rates that have generally been in the mid-30% range. MDN attracted 1,073 new non-employee contributors last year, coming not far behind Kistune/SUMO (1,971) and Firefox (2,923) in terms of new non-employee attraction.

Contribution volume has been generally stable, with a peak of 400 in 2017. Non-employee growth has been driven by a combination of new non-staff contributors and solid retention rates that have generally been in the mid-30% range. MDN attracted 1,073 new non-employee contributors last year, coming not far behind Kistune/SUMO (1,971) and Firefox (2,923) in terms of new non-employee attraction.

Contribution volume from staff and non-staff has grown consistently since 2011. Unfortunately, due to some inconsistencies with Kuma that means staff contributions are likely exaggerated, we’re unable to get a reliably accurate breakdown of staff versus non-staff contributions, but we are confident stating that non-staff contribution volume has been growing steadily since 2011.

Perhaps more interesting is to assess if our October 2017 announcement of a Product Advisory Board for MDN and shared leadership with Microsoft, Google, Samsung, and the W3C had any impact on contribution. Between 1998-2018, we find that Google registered users had 9,226 contributions (article revisions) to Kuma and Microsoft had 3,452. However, the announcement of the Product Advisory Board didn’t have an immediate positive impact on contribution from these companies, although there was a small uptick starting in January 2018. When we look more broadly across contribution to MDN from all 34 strategic commercial contributors, MDN article revisions increased in 2015 and plateaued through 2017, but has since dropped. Again, this analysis is likely affected by the move of browser compatibility data editing to GitHub/Git.

Non-employee contributors to product and web site localization has tripled in the past three years

Pontoon is a Mozilla-specific localization tool through which contributors can help localize all Mozilla products and website content, ranging from the Firefox product to the Mozilla.org web site. Pontoon contributor numbers and contribution volume have grown steadily since our last report in 2017, with a remarkably high first year retention rate of 48% in 2018.

Because contributions to Pontoon are based on translations, potentially counting translations of just a few words as one contribution, this platform follows a very different pattern than Mozilla’s other contribution platforms. We also changed how we counted translations and approvals in Pontoon in 2015, making a comparative view of contribution over time difficult.

Mozilla’s encouragement of browser customization through Add-ons was central to our product’s early success. The under-lying technologies as well as how developers could create and promote extensions have changed over time, but the centrality of community-driven customization hasn’t. Add-ons are popular! 40% of Firefox users have self-installed at least one extension, and these users stay with Firefox longer. Mozilla reports indicates that Firefox users who use Add-ons also show a ~10% increase.

The volume of Add-ons creation and updates has grown dramatically since 2016 – 48% between 2016 and 2018 – most likely driven by the adoption of the WebExtensions API.

COMMUNITY | YEARLY DEVELOPMENT OF CONTRIBUTORS FROM 2008-2018

COMMUNITY | YEARLY DEVELOPMENT OF CONTRIBUTORS FROM 2013-2018

COMMUNITY | YEARLY DEVELOPMENT OF CONTRIBUTORS FROM 2005-2018
As seen in the graph, creating and updating Add-ons has exploded in the past two years, with 46% growth between 2017 and 2018. 1,000 new non-employee contributors created an extension in 2018. AMO also has the highest first year retention rates across all Mozilla contributor platforms, with 71% in 2018, from a peak of 94% in 2008 and a low of 69% in 2012. Because the Add-ons community is a key hub of interconnectivity, Mozilla should monitor it closely.

With the adoption of the WebExtensions API in 2017, extension developers could create and maintain one codebase that works on Firefox, Chrome, and other Chromium-based browsers with only minor modifications. This enabled many Chrome extension developers to port their extensions to Firefox. Unfortunately, some of these developers also produced spam and malicious extensions. We don’t believe this problem significantly impacts the numbers. Still, the Firefox Add-ons team is prioritizing initiatives to keep the Add-ons ecosystem safe for users, including: launching a new Recommended Extensions program to promote extensions that meet Mozilla’s highest standards of security and trust; and educating users about the risks associated with installing non- recommended extensions; and developing new ways to identify and prevent malicious extensions from working in Firefox.

Add-on extensions contributor numbers have grown rapidly since 2015. Note this graph does not include contributors who have made less than five contributions, which explains the low numbers of theme creators.

**AMO’s remarkably high average first year retention rate of 71% suggests that Add-on contributors maintain their extensions and themes**

Understanding key contributor segments—what they are, how they relate to each other, how they change, and their motivations—can help define contributor types we can engage and evaluate with more specificity. Segmentation can also help us pinpoint where there are areas of concern, such as a ratio amongst the contributor segments that’s potentially worrisome over time. For example, a community with a large number of casual contributors, low retention, and a very small number of regular and core contributors might indicate a possible systemic issue: what’s stopping casual contributors from becoming regular and core contributors?

In 2017, we used a simplified adaptation of Kevin Crowston and James Howison's 'onion model' and an adjusted Pareto principle to segment users, defining core as those who generate 80% of contributions, regular as those who generate the next 15%, and casual as those who generate the last 5%. Although commonly used in the industry, this approach doesn’t support an understanding based on the unique nature of a project and its community.

FOR FURTHER RESEARCH
- Where do Add-ons creators start in the Mozilla ecosystem and what is their contributor path?
- What are the particular motivations of Add-on extension creators to participate in so many other areas?

**Contributor Segmentation & “Bridgers”**

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- Where do Add-ons creators start in the Mozilla ecosystem and what is their contributor path?
- What are the particular motivations of Add-on extension creators to participate in so many other areas?

**Definitions: Casual, regular and core contributors**

- **Core contributor**
  - More than 1,000 contributions
- **Regular contributor**
  - 100-1,000 contributions
- **Casual contributor**
  - 6-99 contributions

This area has the least number of contributors. However, localization contributors make a high number of contributions. Therefore, the segment definitions are:

- **Core contributor**
  - More than 50 contributions
- **Regular contributor**
  - 21-50 contributions
- **Casual contributor**
  - 6-20 contributions

This area has by far the highest number of contributors. However, the number of contributions per person is quite low. Therefore, segment definitions are:

- **Core contributor**
  - More than 250 contributions
- **Regular contributor**
  - 21-250 contributions
- **Casual contributor**
  - 6-20 contributions

This area has by far the highest number of contributors. However, the number of contributions per person is quite low. Therefore, the segment definitions are:

- **Core contributor**
  - More than 250 contributions
- **Regular contributor**
  - 21-250 contributions
- **Casual contributor**
  - 6-20 contributions

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- **Core contributor**
  - More than 250 contributions
- **Regular contributor**
  - 21-250 contributions
- **Casual contributor**
  - 6-20 contributions

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- **Core contributor**
  - More than 250 contributions
- **Regular contributor**
  - 21-250 contributions
- **Casual contributor**
  - 6-20 contributions
**Definitions: Casual, regular and core contributors**

<table>
<thead>
<tr>
<th>SEGMENTS</th>
<th>DEFINITION</th>
<th>CONTRIBUTORS</th>
<th>%</th>
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</thead>
<tbody>
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<tr>
<th>SEGMENTS</th>
<th>DEFINITION</th>
<th>CONTRIBUTORS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORE</td>
<td>&gt; 350</td>
<td>1,172</td>
<td>0.3%</td>
</tr>
<tr>
<td>REGULAR</td>
<td>21-250</td>
<td>2,071</td>
<td>0.5%</td>
</tr>
<tr>
<td>CASUAL</td>
<td>6-20</td>
<td>22,312</td>
<td>5%</td>
</tr>
<tr>
<td>VISITORS</td>
<td>1-5</td>
<td>406,067</td>
<td>94%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>429,623</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Local contributors**

<table>
<thead>
<tr>
<th>SEGMENTS</th>
<th>DEFINITION</th>
<th>CONTRIBUTORS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORE</td>
<td>&gt; 1,500</td>
<td>238</td>
<td>12%</td>
</tr>
<tr>
<td>REGULAR</td>
<td>200-1,500</td>
<td>273</td>
<td>13%</td>
</tr>
<tr>
<td>CASUAL</td>
<td>6-200</td>
<td>926</td>
<td>46%</td>
</tr>
<tr>
<td>VISITORS</td>
<td>1-5</td>
<td>598</td>
<td>29%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2,033</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Add-ons (AMO)**

<table>
<thead>
<tr>
<th>SEGMENTS</th>
<th>DEFINITION</th>
<th>CONTRIBUTORS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORE</td>
<td>&gt; 51</td>
<td>197</td>
<td>0.1%</td>
</tr>
<tr>
<td>REGULAR</td>
<td>21-50</td>
<td>626</td>
<td>0.3%</td>
</tr>
<tr>
<td>CASUAL</td>
<td>6-20</td>
<td>3,951</td>
<td>1%</td>
</tr>
<tr>
<td>VISITORS</td>
<td>1-5</td>
<td>213,887</td>
<td>98%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>217,271</td>
<td>100%</td>
</tr>
</tbody>
</table>

As opposed to the earlier network graph, which looked at individual contributors defined by the project to which they contributed the most, this network view shows contributors as defined by their segment, or their total lifetime amount of contributions (casual, regular, core). This network graph looks at the recent years of 2017-2019 and includes non-employee contributors who made more than 5 contributions during this time period (in other words, no “visitors”). The nodes (circles) represent contributors, and the edges (lines) represent contributions from contributors to different Mozilla projects.

Some of the big projects (larger labels) are placed at the periphery because they have a high number of contributors who only participate in those specific projects (e.g. Firefox, Thunderbird, MDN). As in the previous network graph, projects that are placed closer together share many contributors. In the center of the network, we find an extremely engaged group of core and regular contributors who are active on multiple projects. As noted in the earlier network graph, non-employee core participants contribute to an average of 4.3 projects, and non-employee regular participants contribute to an average of 2.5 projects.

In general, the more connections in a network, the stronger it is. By this view, contributor communities in Mozilla’s rebel alliance are generally well connected and robust.
Core contributors – 0.2% of all non-employee contributors – account for 58% of contributions...

...and contribution growth from this segment has risen dramatically since 2009. But we can’t forget the ‘visitor’ segment, which contributes more than either the casual or regular segments.

In 2018, core community members made 40% of all contributions, regular made 16% and casual and visitors combined made 44%.

There is a group of 135 regular and core contributors active on 10+ projects!

Core non-employees are pretty hard core, averaging participation across 4.3 projects!
The recent drop in attraction in the core segment should be monitored, but retention patterns are generally solid. A notably high percentage of casual contributors return.

When we look at the data from a contributor segment perspective, we see steady numbers and few surprises. Attraction is highest for casual contributors, then regular and core. However, there was quite a drop in new core contributors in 2018. First year retention rates are strong across all segments as well.

Mission-Driven Mozillians: Aligning ‘Bridge’ Contributors for Greatest Impact

The 2017 report confirmed that there is not one singular Mozilla community, but rather many, with differences in project focus, personal interest, operational norms and more. 2017 survey data confirmed that one of these communities is a large, global group of enthusiastic contributors who are very motivated by “advancing Mozilla’s mission” and eager to make impactful contributions in multiple areas. Almost 3,000 of these contributors have signed up to be part of the global Mozillians network. The quantitative network graph of these contributors confirms they do work on multiple projects and thus are generally placed within the center of Mozilla’s rebel alliance.

The Rebel Alliance (2017-2019): Mozillians as ‘bridgers’ in the network

This overview shows where registered Mission-driven Mozillians are located in the network. The blue circles are the 854 contributors who registered as Mozillians. Mission-driven Mozillians are well represented in the centre of the network.
Understanding the Rebel Alliance

In order to more effectively engage this globally distributed, mission-driven Mozillian contributor base, the Open Innovation team introduced a new way for volunteers to participate in 2017 through an ever-changing set of Activate Campaigns. These campaigns are curated to be accessible, scalable and particularly mission aligned.

This year, our network analysis of these contributors confirms that these ‘active’ Mission-driven Mozillians – meaning they participated in at least one Activate campaign – also show up as ‘bridgers’ who work on multiple projects.

The Open Innovation team has worked to create Activate campaigns that bring external help to Mozilla projects at moments of particular need, such as for more global perspective and ideas, or to extend capacity. Recent Activate campaigns include:

- Volunteers ran web compatibility testing immediately prior to the launch of Firefox Quantum. Community members tested 6,250 websites and filed 1,300 bugs within seven days.
- The Open Innovation team worked with the Mozilla Foundation Advocacy Team to mobilize Mozilla’s India community around an Open Letter on Data Privacy and Aadhaar, authored by Mitchell Baker and addressed to Justice Srikrishna. Within a month, the open letter was co-signed by 1,300 Mozilla India community members. The letter was also published as a full-page advertisement in the February 9, 2019 edition of The Hindustan Times.
- Volunteers submitted more than 2,600 new sentences in more than 30 languages to Common Voice in just one week, helping the project expand into new locales.
- In a Firefox Support Sprint, 431 volunteers replied to 2,200 1 and 2-star Firefox reviews on the Google Playstore in 9 different languages, increasing Firefox’s star rating.
- Over 5,000 volunteers downloaded and tested the beta version of the new Firefox for Android in the Firefox BugHunter Campaign. Volunteers filed more than 300 bugs.

In each of these campaigns, the Open Innovation team paid close attention to designing a campaign that directly appealed to those motivated by Mozilla’s mission and improved the process based upon participant feedback. The campaigns were successful enough that we recently began encouraging visitors to the Contribute page to join and have also folded in subscribers to the historical ‘community campaigns’ mailing list.

One question we asked in this year’s report was whether these Activate campaigns spurred sustained engagement in the target project.

In October 2017, Mozilla ran an Activate campaign on Web Compatibility (aka Firefox Quantum sprint). While the campaign was successful, it didn’t generate sustained participation. It would be interesting to see how these numbers break down between new-to-the-project participants and veterans and to follow up with participants to understand why they didn’t continue to participate. It may very well be that participants are more interested in discrete, time-bound campaigns rather than deeper, longer-term engagements.

FOR FURTHER RESEARCH

- What can we understand about the flow between the segments, that is, the percentage of contributors who move to the next category and the time it takes to do so?
- What motivates contributors to participate in multiple Mozilla projects? Is there anything common in their contribution patterns?
- Does our analysis of social connectedness relate in any way to the contribution patterns of these ‘bridger’ core contributors?
Understanding the Rebel Alliance

Attraction and Retention

Attraction and retention numbers are obviously important indicators of community health, as well as proxies for things like discoverability. This analysis looks at contribution combined across all areas of participation.

When looking at all areas and types of contribution, attraction is steady and retention rates are strong.

<table>
<thead>
<tr>
<th>Year</th>
<th>Attraction</th>
<th>1 Year Retention</th>
<th>2 Year Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>814</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>1229</td>
<td>66%</td>
<td>55%</td>
</tr>
<tr>
<td>2001</td>
<td>1624</td>
<td>53%</td>
<td>42%</td>
</tr>
<tr>
<td>2002</td>
<td>1853</td>
<td>55%</td>
<td>40%</td>
</tr>
<tr>
<td>2003</td>
<td>1028</td>
<td>52%</td>
<td>41%</td>
</tr>
<tr>
<td>2004</td>
<td>945</td>
<td>48%</td>
<td>37%</td>
</tr>
<tr>
<td>2005</td>
<td>936</td>
<td>45%</td>
<td>35%</td>
</tr>
<tr>
<td>2006</td>
<td>1034</td>
<td>51%</td>
<td>45%</td>
</tr>
<tr>
<td>2007</td>
<td>869</td>
<td>47%</td>
<td>37%</td>
</tr>
<tr>
<td>2008</td>
<td>2087</td>
<td>54%</td>
<td>40%</td>
</tr>
<tr>
<td>2009</td>
<td>5305</td>
<td>56%</td>
<td>45%</td>
</tr>
<tr>
<td>2010</td>
<td>3593</td>
<td>42%</td>
<td>40%</td>
</tr>
<tr>
<td>2011</td>
<td>4680</td>
<td>42%</td>
<td>31%</td>
</tr>
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<td>2012</td>
<td>6696</td>
<td>46%</td>
<td>34%</td>
</tr>
<tr>
<td>2013</td>
<td>5881</td>
<td>44%</td>
<td>34%</td>
</tr>
<tr>
<td>2014</td>
<td>5008</td>
<td>43%</td>
<td>31%</td>
</tr>
<tr>
<td>2015</td>
<td>5466</td>
<td>47%</td>
<td>34%</td>
</tr>
<tr>
<td>2016</td>
<td>4811</td>
<td>48%</td>
<td>35%</td>
</tr>
</tbody>
</table>

**Attraction:** The number of people who made their first contribution within a given year.

**1-Year Retention:** Share of contributors who were also active the previous year.

**2-Year Retention:** Share of contributors who were active two years ago.

As one would guess from the earlier view of overall non-employee contributor numbers, we see that new participants continue to join in numbers that have generally been increasing. 2014 and 2015 were the most attractive years, with approximately 6,000 new contributors in those years. SUMO (support) is responsible for a large portion of that growth.

Firefox brings in the most new contributors, followed by MDN. Over its lifetime, Gecko has lost its ability to attract new non-employee contributors.

When we include Localization, Support and document revisions as part of contribution, we see that Firefox, MDN and Thunderbird are consistently the main ‘trampmats’ for new contributors. However, note that this analysis does not include sentence validation and voice recordings from Common Voice. Per our survey, new contributors were attracted most to Firefox, Common Voice, and Add-ons, respectively.
First and second year retention rates are generally laudable and steady. Although second year retention is steady for DevTools, a recent drop in the first year retention rate might merit observation. Conversely, last year saw a notable increase for first and second year retention in Firefox iOS, and it'd be interesting to know why. Geckos seems to be keeping contributors but not attracting new ones at the same pace.
Social Connectedness

We often hear that the fun and camaraderie of participating in Mozilla’s communities is a big draw. Survey responses bear this out, even though networking goals were the lowest motivator, behind self-improvement and social impact, with about 30% of respondents calling it a key motivator.

Moreover, while the primary reason contributors dropped out was a busy schedule, lack of community was the second most cited reason.

Humans are social creatures. We hypothesize that social connectedness could be a health indicator—either through correlation or causation—of a community with high social capital and internal cohesion, and thus higher retention and efficiency in working together.

By looking at participation in comment threads to pull requests on GitHub/Git,* we’ve developed a social network measure that describes how connected contributors are to one another. As a proxy measure for social connectedness, this can be combined with other measures in future reports to gain insights about the impact of being more or less socially connected. Ultimately, this might inform Mozilla about how to best nurture thriving contributor communities.

The network shows which projects generate social ties between contributors through the comment threads related to any pull request or issue. Every node is a contributor. The colors represent the project that the person has contributed to the most. Size indicates how many different people the contributor has interacted with through the comments (i.e., level of interconnectivity of a particular contributor).

By this measure, Rust displays significantly more social connectedness than any other Mozilla community about 37.7% as compared to the next communities, Servo and Firefox, which are both about 8.5%. However, when we look at retention rates, we don’t see that same discrepancy, with Rust’s average two year retention rate at 47% compared to Servo’s and Firefox’s 42% and 32%, suggesting that social connectedness does not have a large impact on retention.

Still, this is a rich area for further investigation. There is a good amount of existing research on social network analysis of open source communities in particular that may act as a starting point.
Measuring ‘efficiency’ impacts of social connectedness: pull request reviews and issue resolution

There is also a correlation between how interconnected a contributor is and how fast their pull requests or issues are resolved. If a contributor is connected to eight or more people, the leadtime is usually around 2 weeks or less.

On the contrary, we find no correlation between how well connected a contributor is and how fast their issues are resolved. Issues generally have a longer leadtime than pull requests.

FOR FURTHER RESEARCH
• Is there any relationship social connectedness and demographic information, such as gender or language(s) spoken?
• Is there any relationship between social connectedness and participation in other non-Mozilla projects?
• How does this relate with our understanding of ‘bridgers’? Would a combination of these views show particular influence?
Across all GitHub/Git projects, BMI has been remarkably stable since 2014 at around 0.4, with lead times for closing issues also fluctuating but significantly less bugs – and thus less lead times – than Bugzilla.

Across all GitHub/Git projects, efficiency around the ratio of open to closed pull requests (REI) has been stable around 1. Average lead times have had more fluctuation but is pretty steady, landing at between 7-14 days in 2018.
Diversity and Inclusion

Like many other organizations in the open source space, Mozilla has only recently begun to emphasize and prioritize diversity and inclusion efforts. Since the inception of open source as a co-development model, the unfortunate norm has been inaction; too often, open source initiatives have relied on the comfortable but false assumption that open co-development is inherently inclusive. In reality, open source communities tend to be less diverse than the overall tech industry.

Open source practitioners have begun to realize the complexity of influencing change in their communities—a particularly frustrating problem as many communities believe they are genuinely inclusive. There is a clear need for quality tools and data to help open source communities promote diversity and inclusion, as well as to measure the impact of such interventions. For example, Mozilla worked closely with the Linux Foundation’s CHAOSS project to establish the first-ever set of inclusivity measurements in open source metrics. As these efforts continue to ramp up, we believe that measuring and monitoring indicators of inclusivity will be integral to our goals.

In our 2017 report on contributor communities, Mozilla leveraged the genderize.io service to attempt a rough understanding of binary gender in our open source communities as determined through data on Git commits. This approach was clearly imperfect and not inclusive, in that it failed to reflect the breadth of gender identities or allow self-identification. The methodology itself failed to incorporate the very type of inclusivity measures we would hope to integrate into our core practices.

Still, it gave us some insight and a way to benchmark ourselves against other open source projects using the same methodology, and we did conduct another genderize.io analysis this year. However, moving forward, Mozilla will no longer use this methodology and will instead rely on surveys and contributor interviews to better measure how inclusive our contributor communities are as well as areas for improvement.

Since 2016, per the genderize.io measurements, gender diversity in Mozilla’s communities has grown from 6.5% of contributors identifying as women to 8% in 2018. Survey respondents who identified as female remained the same between 2016 and 2018, at around 10% (Note: survey respondents included contributors to non-code and code areas of participation). While these kind of gender diversity metrics are within the average range for open source communities, they are far from enough. Mozilla and others in the industry have a long way to go towards promoting and ensuring diversity within our open source communities.

When we look at a gender representation across age groups, it’s notable that there are about 40% more women than men between the ages of 19-24, but this relationship inverts dramatically in the next age group. There’s also a dramatic difference between non-binary/third gender/self-describe in these age groups.

The higher number of women in the younger cohort could reflect a spike due to programs like the Open Source Student Network, which strives to engage college and university students in an array of open source projects, including those sponsored by Mozilla. It could also reflect that the contribution experience, motivations, or general situation of the older cohort is quite different. However, the motivations of these two age groups doesn’t differ much, so it seems unlikely that motivations cause such a large shift. We do know that the largest reason for stopping participation is burnout and getting busy in work or personal life (65%). The drop might also signal that something happens early in the experience of contributing or in the lives of women that makes continued participation less valuable or engaging.

Women are most represented in the youngest age group, while non-binary/third gender/self-describe are most represented in second youngest group

Gender across rating of overall experience

*Note on the survey data: We had 1,144 complete responses, slightly higher than our 2017 survey. However, due to very small numbers of people identifying as either non-binary/third gender or choosing to self-describe, we often had to combine the categories in order to say something meaningful about gender differences. When possible, we kept the categories separate. Still, our survey enabled us to generate a more nuanced understanding of diversity as well as gather data from non-coding contributor communities.
**We need more qualitative, project-level research to inform how we can improve diversity in our communities through more inclusive practices**

We did see troubling data around the experiences of non-binary/third gender/self describe, with 35% describing their experiences as negative or extremely negative. This points to a need for more qualitative research to understand exactly what is being reported as negative. We do know from past D&I research that efforts to ‘lump’ everyone who is not-male into the category of women is far from ideal.

In 2018 and 2019, we also established better enforcement of our Community Participation Guidelines, which we expect to help increase participation from those not well represented in open source. In general, we need more qualitative, project-level research to inform how we can improve diversity in our communities through more inclusive practices. We found this most recently in our hands-on diversity research with the Developer Tools/Debugger community. Asking five non-male contributors simple questions about their experiences around community leadership, governance and communication revealed small areas of improvement that could positively influence their experiences.

We were able to ask a broader set of questions around diversity and inclusion in this year’s survey. For example, we asked questions about disability for the first time. The results aren’t compelling, as we weren’t able to get enough data on how disability affects experience, but this is something on which to follow up. The survey results do suggest that people identifying as having a disability found it challenging to contribute: 72% of those who responded that they never contributed also have a disability, as opposed to 5% of active participants.

Nearly as many women as men contribute to coding, while non-technical contributions like localization and voice recording are more predominantly male. This is contrary to the bias that women prefer non-technical contribution.

Despite slogans like “inclusion is everyone’s job,” most people working to improve diversity and inclusion in open source are also those most impacted when it fails. They are the most likely to take on emotional labour, the most likely to burn out, and sadly, the most likely to face backlash and trolling.

Yet might we be at a turning point? The #metoo movement has created a surge of companies and organizations that are prioritizing inclusive workplaces – and employees are increasingly holding them accountable. A similar type of activism is emerging within open source.

Still, the Open Innovation team’s 2017 research into diversity and inclusion found that while the open source ecosystem was beginning to prioritize efforts to be more inclusive, these efforts were taking place in information silos with little consistent application of useful metrics and best practices.

To address these problems, we created a network dedicated to connecting researchers, academics, projects, government and others invested in diversity and inclusion in open source to accelerate needed change. We also worked with the Linux Foundation’s CHAOSS project to create a set of peer-validated metrics to help project owners understand, evaluate and ultimately improve how their projects include and empower everyone. A selection of those metrics can be found in a basic checklist for evaluating and improving governance, leadership, communication and documentation. These metrics have been applied with Mozilla’s Open Source Support Program (MOSS) and Fox for Developer Tools. The Linux Foundation’s Hyperledger project also plans to implement them. Mozilla should also implement and measure them as part of our open source health metrics.

Perhaps the tool for change that’s most exciting because of its immediate applicability is the bugly bug. Because software engineers and community managers already expect to see reports of “bugs” in their software, adding a new category of bugs for reporting problems or opportunities around inclusion is low effort. For example, if a contributor is evaluating an open source project and sees that the code of conduct does not include information about to whom a code of conduct report goes, he can open a bug report to start a process of discussion and change.

This simple approach fosters a process in which anyone can report or fix issues of inclusion. Moreover, it moves us from a broken system dependent on the remedial efforts of underrepresented and marginalized people to one in which a broader ‘rebel alliance’ of problem solvers can work on needed changes and in which communities hold projects accountable for implementation of those changes.
Open Source Projects: Towards an understanding of open source health

A key aim of this report was to begin creating an evidence-based framework for understanding the ‘health’ of Mozilla’s open source projects. While we are still some ways from this goal, we present a beta version that is generalized in its application to our main open source products and communities. We also sketch a future vision.

For this beta version, we’ve conceptually followed the Open Source Ecosystem Health Operationalization (OSEHO) framework proposed by Slinger Jansen (2014)*, which builds on three recognized pillars for business ecosystem health research: productivity, robustness, and niche creation.

We haven’t published all data outlined in this framework, as our time was limited and we didn’t have access to or an understanding of some data (e.g., data around niche creation or contribution quality). We still believe this framework is useful despite being generalized and missing important aspects of health, like metrics related to contributor reward, community inclusiveness, social connectedness, and better integration of traditional software metrics. It should spur discussion of what Mozilla’s approach to open source metrics should be. It also encourages us to assess our projects as part of well-functioning ecosystems, and gives us a very general benchmark we can use in the future.

**PRODUCTIVITY**
- Total factor productivity
- Productivity improvement
- Delivery of innovations

**ROBUSTNESS**
- Survival rates
- Persistence of structure
- Predictability
- Limited obsolescence
- Continuity

**NICHE CREATION**
- Value creation
- Variety

**PRODUCTIVITY DATA? ROBUSTNESS DATA? NICHE CREATION DATA?**

- Contribution acceptance and users
- Yes
- User acquisition/satisfaction
- Yes
- Bug resolution time
- Yes, where available
- User retention
- Yes
- Pull request resolution time
- Yes
- User diversity (segments, roles)
- Yes, but future work should include inclusivity environments as well as a proxy for the diversity for which we value in our communities
- Issue resolution time
- Yes
- Project comprehensiveness (networkers)
- Yes
- New issues/tickets
- Yes
- Contributor satisfaction (surveying)
- Not enough data at a project level for this report
- Knowledge creation (e.g., articles, QA forums)
- Yes, where available
- Contributor quality
- Yes
- Usage (end users)
- No
- User collaboration (team)
- No
- Project collaboration – social cohesion within project
- Not detailed by project here but described at a broad level across separate sections
- Project collaboration – external/embassies
- Same description applies to above here, should build on the insights earlier in report

Referencing back to the centrality of open source co-development to Mozilla’s rebel alliance and our open by design strategy – in particular building community for impact – the Open Innovation team hopes to work with Mozilla product teams to create more tailored analyses for their open source projects.

**VISION FOR OPEN SOURCE HEALTH METRICS**

In a world where open source effort is spread across the entire open source ecosystem, and where lasting success comes through building communities shaped to specific projects, Mozilla needs health metrics that reveal how it is working with those communities to fulfill the goals for each open source effort. The most valuable questions about health should be derived from these unique goals, perhaps guided by the open source archetypes Mozilla created in collaboration with OpenTech Strategies. Appropriate metrics that answer those questions can then be chosen. For example, if an open source goal is to provide infrastructure defined and used by multiple vendors, then a key success metric would be attracting co-investment from partners. In this example, general pull request efficiency might not be as important as the rate at which partner contributors pick up high-priority issues.

A revised approach to open source health metrics would enable Mozilla to move from simply measuring project activity to measuring what actually matters: fulfillment of our strategic, mission-driven goals, including providing an inclusive, rewarding experience for contributors. These metrics should illuminate how our goals are being met through the give-and-take of collaborative development involving individuals, organizations, and the greater open source ecosystem. They are fundamentally about relationships that produce better products and more mutual value.

The Open Innovation and IT teams are creating a unified identity and access management system for employees and non-employee contributors. The Mozilla People Directory is the first step in this project to better integrate non-employee contributors and provide secure, appropriate access to Mozilla services and workflows. A longer term vision might be to use this project as a foundation for a more people-and-organization-first view of collaboration metrics.

Understanding the Rebel Alliance

Community health

Firefox

Summary

Robustness

By Mozilla network engagement: A great share of Firefox contributors do not contribute to any other projects. Cross-contribution happens mainly with Gecko and Thunderbird, followed by Web Properties, Add-ons/Web Extensions and MDN. It’s notable that the core segment is also very active on other projects.

By attraction and retention: When taking all forms of contribution into consideration, Firefox has the highest number of contributors, including non-staff contributors. Its 1st and 2nd year retention rates are average, compared to other Mozilla projects, but have increased over the past two years.

By user diversity: Contributions are mainly from the core segment, implying a lower degree of diversity compared to other projects.

What counts as a contribution? Contributions from: Bugzilla, GitHub/Git, AMO, Kitsune and Pontoon.

Key figures*  

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributors</td>
<td>12,334</td>
</tr>
<tr>
<td>Contributions to Firefox</td>
<td>747,524</td>
</tr>
<tr>
<td>Code specific contributions</td>
<td>65,371</td>
</tr>
<tr>
<td>Contributions across the Mozilla project</td>
<td>1,870,928</td>
</tr>
</tbody>
</table>

Notes to the network

The network includes all contributors who have more than 5 contributions to Firefox (only non-staff).

Time period

2017-2019

Colored nodes

Contributors with more than 5 contributions to Firefox, colored by segment

Nodes with labels

Projects with more than 5 Firefox-contributors
Understanding the Rebel Alliance

Firebox

**ROBUSTNESS • Attraction and retention of contributors**

**DATA**
Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**
2017-2019

**ROBUSTNESS • Diversity of contributors**
(segments and roles)

**ROBUSTNESS • Networkers between projects**

**PRODUCTIVITY •**
Attraction and retention of contributors

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**DATA**
Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**
2017-2019

**PRODUCTIVITY •**
Attraction and retention of contributors

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**DATA**
Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**
2017-2019

**PRODUCTIVITY •**
Attraction and retention of contributors

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**DATA**
Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**
2017-2019

**PRODUCTIVITY •**
Attraction and retention of contributors

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

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Attraction and retention of contributors

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)

**PRODUCTIVITY •**
Lead time for pull requests and issues (GitHub/Git)
Summary

ROBUSTNESS

By Mozilla network engagement: Most cross-contribution occurs with Firefox, followed by MDN, Infrastructure, and Add-ons.

By attraction and retention: 76% of Gecko contributors are non-staff. However, most contribution (85%) comes from staff. Gecko’s 1st and 2nd year retention rates are high and have been on the rise.

By user diversity: Contributions come equally from casual, regular and core segments, implying a high degree of diversity. As the network shows, Gecko contributors are often quite active on several other projects – and this is true for all three segments.

What counts as a contribution? Contributions from Bugzilla and GitHub.

KEY FIGURES*

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Contributors</td>
<td>2,680</td>
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<tr>
<td>Contributions to Gecko</td>
<td>51,373</td>
</tr>
<tr>
<td>Contributions across the Mozilla Project</td>
<td>362,953</td>
</tr>
</tbody>
</table>

NOTES TO THE NETWORK

The network includes all contributors who have more than 5 contributions to Gecko (only non-staff).

TIME PERIOD

2017-2019

COLORED NODES

Contributors with more than 5 contributions to Gecko, colored by segment

NODES WITH LABELS

Projects with more than 5 Gecko-contributors

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019.
Community health

Gecko

ROBUSTNESS • Attraction and retention of contributors

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>1 YEAR RETENTION</th>
<th>2 YEAR RETENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017-2019</td>
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</tbody>
</table>

DATA
Includes only non-staff contributors with more than 5 contributions (staff excluded)

TIME PERIOD
2017-2019

ROBUSTNESS • Diversity of contributors (segments and roles)

<table>
<thead>
<tr>
<th>CONTRIBUTIONS</th>
<th>casual</th>
<th>regular</th>
<th>core</th>
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</thead>
<tbody>
<tr>
<td>share of contributors and contributions</td>
<td></td>
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</table>

ROBUSTNESS • Networkers between projects

<table>
<thead>
<tr>
<th>CONTRIBUTIONS</th>
<th>core</th>
<th>regular</th>
<th>casual</th>
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<tbody>
<tr>
<td>share of bridges from segments</td>
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PRODUCTIVITY • Amount of contributions on GitHub/Git

PRODUCTIVITY • Lead time for pull requests and issues (GitHub/Git)

DATA
Includes only non-staff contributors with more than 5 contributions (staff excluded)

TIME PERIOD
2017-2019

Productivity

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

CONTRIBUTIONS

CONTRIBUTORS
Community health

Developer Tools

Summary

**ROBUSTNESS**

By Mozilla network engagement: DevTools contributors overlap most with Gecko, followed by Firefox, Infrastructure, and MDN. All core and most regular contributors work on multiple Mozilla projects. With a small number of contributors overall, these individuals should be known and well supported!

By attraction and retention: 66% of DevTools contributors are non-staff, but most contributions come from staff (75%).

By user diversity: However, quite unusually we find that this project has the majority of contributions from casual and regular contributors. The number of new contributors (attraction) has been steady after a jump in 2015, with first and second year retention rates also steadily increasing.

What counts as a contribution? Contributions from: Bugzilla and GitHub/Git

---

**KEY FIGURES**

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019

**CONTRIBUTORS**

243

**CONTRIBUTIONS TO GECKO**

4,343

**CONTRIBUTIONS ACROSS THE MOZILLA PROJECT**

24,212

---

**NOTES TO THE NETWORK**

The network includes all contributors who have more than 5 contributions to DevTools (only non-staff).

**TIME PERIOD**

2017-2019

**COLORED NODES**

Contributors with more than 5 contributions to DevTools; colored by segment

**NODES WITH LABELS**

Projects with more than 5 DevTools contributors
Understanding the Rebel Alliance

Community health

Developer Tools

**ROBUSTNESS • Attraction and retention of contributors**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ATTRACTION</th>
<th>1 YEAR RETENTION</th>
<th>2 YEAR RETENTION</th>
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<tr>
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<tr>
<td>2018</td>
<td>287</td>
<td>141</td>
<td>99</td>
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</tbody>
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**DATA**

Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**

2017-2019

**ROBUSTNESS • Diversity of contributors**

( segments and roles)

<table>
<thead>
<tr>
<th>CONTRIBUTIONS</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
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<tbody>
<tr>
<td>casual</td>
<td>48</td>
<td>80</td>
<td>15</td>
<td>5</td>
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<tr>
<td>core</td>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Contribution share**

- Community
- Mozilla staff

**ROBUSTNESS • Networkers between projects**

- Only active on Developer Tools
- Developers and one other project
- Developers and several other projects

<table>
<thead>
<tr>
<th>ROLE</th>
<th>CORE</th>
<th>REGULAR</th>
<th>CASUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>78</td>
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<td></td>
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<td>53</td>
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</tbody>
</table>

**PRODUCTIVITY • Amount of contributions on GitHub/Git**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>commit</th>
<th>issue</th>
<th>pull request</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
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<td>2018</td>
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</tbody>
</table>

**PRODUCTIVITY • Lead time for pull requests and issues (GitHub/Git) and bugs (Bugzilla)**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>commit</th>
<th>issue</th>
<th>pull request</th>
</tr>
</thead>
<tbody>
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**PRODUCTIVITY • Lead time for pull requests**

<table>
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<tr>
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<th>pull request</th>
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**PRODUCTIVITY • Lead time for issues**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>commit</th>
<th>issue</th>
<th>pull request</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
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**PRODUCTIVITY • Lead time for bugs**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>commit</th>
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**Attraction and retention of contributors**

**Community health**

**Developer Tools**

**DATA**

Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**

2017-2019

**ROBUSTNESS • Attraction and retention of contributors**

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**TIME PERIOD**

2017-2019

**ROBUSTNESS • Diversity of contributors**

( segments and roles)

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<td>53</td>
<td></td>
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</tbody>
</table>
Understanding the Rebel Alliance

Community health
Firefox for Android

Summary

ROBUSTNESS

By Mozilla network engagement: Firefox Android developers mainly overlap with Firefox, followed by Gecko, Web Properties and Thunderbird. A notably high percentage of core contributors (85%), regular (58%) and casual participants (36%) contribute to multiple Mozilla projects, as evidenced in the graph.

By attraction and retention: Firefox Android is remarkably community-driven: 81% of the contributors are non-staff, and they account for 80% of contributions. However, compared to other projects, the community has very low 1st and 2nd year retention rates.

By user diversity: Most contributions come from the core segment.

What counts as a contribution? Contributions from: Bugzilla, GitHub/Git, Kitsune, Pontoon and AMO

KEY FIGURES*

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019

1,111
CONTRIBUTORS

26,519
CONTRIBUTIONS TO
FIREFOX ANDROID

2,468
CODE SPECIFIC CONTRIBUTIONS
(GIT/GITHUB/GIT, BUGZILLA)

1,525,219
CONTRIBUTIONS ACROSS
THE MOZILLA PROJECT

NOTES TO THE NETWORK

The network includes all contributors who have more than 5 contributions to Firefox Android (only non-staff).

TIME PERIOD

2017-2019

COLORED NODES

Contributors with more than 5 contributions to Firefox Android, colored by segment

NODES WITH LABELS

Projects with more than 5 Firefox Android contributors

INCOMPLETE DATA

Unfortunately, our Firefox for Android analyses did not include the full set of relevant repositories, so contributor numbers and contribution volume is underrepresented.

Firefox Android
Firefox
Thunderbird
Add-ons
Web Properties
Firefox Focus
Firefox Accounts
Firefox iOS
Infrastructure
MDN
Gecko
Mozilla support (SUMO)
Localisation
Core
Regular
Casual
**Community health**

**Firefox for Android**

**ROBUSTNESS** • Attraction and retention of contributors

<table>
<thead>
<tr>
<th>Year</th>
<th>Active Contributors</th>
<th>Year Retention</th>
<th>1 Year Retention</th>
<th>2 Year Retention</th>
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<td>16%</td>
<td>461</td>
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<td>486</td>
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<td>2018</td>
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<td>-</td>
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<td>-</td>
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**ROBUSTNESS** • Diversity of contributors (segments and roles)

<table>
<thead>
<tr>
<th>Year</th>
<th>Community</th>
<th>Mozilla Staff</th>
<th>Casual</th>
<th>Regular</th>
<th>Core</th>
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<td>70</td>
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**ROBUSTNESS** • Networkers between projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Core</th>
<th>Regular</th>
<th>Casual</th>
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<tbody>
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<tr>
<td>2013</td>
<td></td>
<td>599</td>
<td>170</td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td>673</td>
<td>412</td>
</tr>
<tr>
<td>2015</td>
<td></td>
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<td>2016</td>
<td></td>
<td>633</td>
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<td>2017</td>
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<td>597</td>
<td>382</td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td>654</td>
<td>351</td>
</tr>
</tbody>
</table>

**PRODUCTIVITY** • Amount of contributions on GitHub/Git

**PRODUCTIVITY** • Lead time for pull requests and issues (GitHub/Git) and bugs (Bugzilla)

**DATA**

Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**

2017-2019

**Firefox / Android / GitHub/Git activity**

**Firefox / Android / Code contributions development**
Community health

Firefox iOS

Summary

ROBUSTNESS

By Mozilla network engagement: Firefox iOS non-staff contributors mainly overlap with Firefox, but they are very engaged across other Mozilla projects. This is true of all contributor segments.

By attraction and retention: As with Firefox Android, Firefox iOS is very community-driven: most contributors are non-staff (77%), and they account for most contributions (71%). Unlike Firefox Android, the Firefox iOS community has high 1st and 2nd year retention rates.

By user diversity: 90% of contributions come from the core segment, a low degree of diversity that might be problematic.

What counts as a contribution? Contributions from: Bugzilla, GitHub/Git, Kitsune and Pontoon.

KEY FIGURES*

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019

CONTRIBUTORS 418

CONTRIBUTIONS TO FIREFOX IOS 52,196

CODE SPECIFIC CONTRIBUTIONS (GIT/GITHUB/GIT, BUGZILLA) 1,815

CONTRIBUTIONS ACROSS THE MOZILLA PROJECT 1,344,975

NOTES TO THE NETWORK

The network includes all contributors who have more than 5 contributions to Firefox iOS (only non-staff).

TIME PERIOD

2017-2019

COLORED NODES

Contributors with more than 5 contributions to Firefox iOS, colored by segment

NODES WITH LABELS

Projects with more than 5 Firefox IOS contributors
Community health

Firefox iOS

ROBUSTNESS • Attraction and retention of contributors

<table>
<thead>
<tr>
<th></th>
<th>1 YEAR RETENTION</th>
<th>2 YEAR RETENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTRITION</td>
<td>11</td>
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</tr>
<tr>
<td>149</td>
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<td>214</td>
<td>151</td>
<td>86</td>
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<td>245</td>
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<td>287</td>
<td>141</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>18%</td>
</tr>
</tbody>
</table>

DATA
Includes only non-staff contributors with more than 5 contributions (staff excluded)

TIME PERIOD
2017-2019

ROBUSTNESS • Diversity of contributors (segments and roles)

<table>
<thead>
<tr>
<th>CONTRIBUTIONS</th>
<th>casual</th>
<th>regular</th>
<th>core</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
<td>90</td>
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</tr>
<tr>
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<td>17</td>
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</tr>
<tr>
<td>0%</td>
<td>20%</td>
<td>40%</td>
<td>60%</td>
</tr>
</tbody>
</table>

CONTRIBUTORS

<table>
<thead>
<tr>
<th>CONTRIBUTIONS</th>
<th>Community</th>
<th>Mozilla staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>71</td>
<td>29</td>
</tr>
<tr>
<td>77</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>0%</td>
<td>20%</td>
<td>40%</td>
</tr>
</tbody>
</table>

ROBUSTNESS • Networkers between projects

<table>
<thead>
<tr>
<th>PROJECTS</th>
<th>CORE</th>
<th>REGULAR</th>
<th>CASUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firefox iOS</td>
<td>12</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>Firefox iOS and several other projects</td>
<td>96</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>Firefox iOS and one other project</td>
<td></td>
<td></td>
<td>49</td>
</tr>
</tbody>
</table>

ROBUSTNESS • Amount of contributions on GitHub/Git

PRODUCTIVITY • Lead time for pull requests and issues (GitHub/Git) and bugs (Bugzilla)

PRODUCTIVITY • Average lead time for pull requests

PRODUCTIVITY • Average lead time for issues

PRODUCTIVITY • Average lead time for bugs

DATA
Includes only non-staff contributors with more than 5 contributions (staff excluded)

TIME PERIOD
2017-2019

Firefox iOS

Community health
Summary

**ROBUSTNESS**

By Mozilla network engagement: Servo contributor mainly overlap with Gecko, followed closely by Rust.

By attraction and retention: Most contributors are non-staff, but their contributions comprise the 29% of the overall volume. 1st and 2nd year retention rates have dropped since 2016, with the 1st year retention rate still very acceptable but the 2nd rate perhaps of concern.

By user diversity: By contributor segments, the Servo community seems robust and diverse, with contributions well distributed across the segments.

What counts as a contribution? Contributions from GitHub/Git.

---

**NOTES TO THE NETWORK**

The network includes all contributors who have more than 5 contributions to Servo (only non-staff).

**TIME PERIOD**

2017-2019

**COLORED NODES**

Contributors with more than 5 contributions to Servo, colored by segment

**NODES WITH LABELS**

Projects with more than 5 Servo-contributors
**Community health**

**Servo**

**ROBUSTNESS • Attraction and retention of contributors**

<table>
<thead>
<tr>
<th>Year</th>
<th>Active Contributors</th>
<th>Retention</th>
<th>Year on Project</th>
<th>Year on Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>2013</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>2014</td>
<td>195</td>
<td>162</td>
<td>58</td>
<td>50%</td>
</tr>
<tr>
<td>2015</td>
<td>344</td>
<td>274</td>
<td>125</td>
<td>55%</td>
</tr>
<tr>
<td>2016</td>
<td>454</td>
<td>326</td>
<td>216</td>
<td>60%</td>
</tr>
<tr>
<td>2017</td>
<td>443</td>
<td>281</td>
<td>292</td>
<td>47%</td>
</tr>
<tr>
<td>2018</td>
<td>263</td>
<td>233</td>
<td>313</td>
<td>47%</td>
</tr>
</tbody>
</table>

**DATA**

Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**

2017-2019

**ROBUSTNESS • Diversity of contributors**

<table>
<thead>
<tr>
<th>Segment</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual</td>
<td>34</td>
<td>78</td>
<td>18</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Core</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ROBUSTNESS • Networkers between projects**

Only active on DevTools
DevTools and one other project
DevTools and several other projects

<table>
<thead>
<tr>
<th>Segment</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>8</td>
<td>15</td>
<td>77</td>
<td>15</td>
<td>30</td>
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</tr>
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<td>Regular</td>
<td></td>
<td></td>
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<td></td>
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<td>Casual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**PRODUCTIVITY • Amount of contributions on GitHub/Git**

**PRODUCTIVITY • Lead time for pull requests and issues (GitHub/Git)**

**Average lead time - bugs**

**Community health**

**Servo**

**ROBUSTNESS • Attraction and retention of contributors**

<table>
<thead>
<tr>
<th>Year</th>
<th>Active Contributors</th>
<th>Retention</th>
<th>Year on Project</th>
<th>Year on Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>2013</td>
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<tr>
<td>2014</td>
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<td>162</td>
<td>58</td>
<td>50%</td>
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</tr>
<tr>
<td>2018</td>
<td>263</td>
<td>233</td>
<td>313</td>
<td>47%</td>
</tr>
</tbody>
</table>

**DATA**

Includes only non-staff contributors with more than 5 contributions (staff excluded)

**TIME PERIOD**

2017-2019

**ROBUSTNESS • Diversity of contributors**

<table>
<thead>
<tr>
<th>Segment</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual</td>
<td>34</td>
<td>78</td>
<td>18</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ROBUSTNESS • Networkers between projects**

Only active on DevTools
DevTools and one other project
DevTools and several other projects

<table>
<thead>
<tr>
<th>Segment</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>8</td>
<td>15</td>
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<td>15</td>
<td>30</td>
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<tr>
<td>Regular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**PRODUCTIVITY • Amount of contributions on GitHub/Git**

**PRODUCTIVITY • Lead time for pull requests and issues (GitHub/Git)**

**Average lead time - bugs**
Community health
Rust

**Summary**

**ROBUSTNESS**

By Mozilla network engagement: Rust contributors participate elsewhere across Mozilla. Gecko and Servo are the primary partner projects, but we also find cross-participation in Firefox, Web Properties, MDN, Thunderbird and Infrastructure.

By attraction and retention: Rust is mainly driven by non-staff contributors and has very high 1st and 2nd year retention rates compared to other projects at Mozilla.

By user diversity: contributions come relatively equally from casual, regular and core segments, implying a high degree of segment diversity.

What counts as a contribution? Contributions from Bugzilla (only 2010) and GitHub/Git

**KEY FIGURES**

1,711

CONTRIBUTORS

49,923

CONTRIBUTIONS TO RUST

123,280

CONTRIBUTIONS ACROSS THE MOZILLA PROJECT

NOTES TO THE NETWORK

The network includes all contributors who have more than 5 contributions to Rust (only non-staff).

TIME PERIOD
2017-2019

COLORED NODES
Contributors with more than 5 contributions to Rust, colored by segment

NODES WITH LABELS
Projects with more than 5 Rust-contributors

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019.
Understanding the Rebel Alliance

Community health

Rust

ROBUSTNESS • Attraction and retention of contributors

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>1 YEAR RETENTION</th>
<th>2 YEAR RETENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>2013</td>
<td>110</td>
<td>7</td>
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<tr>
<td>2014</td>
<td>312</td>
<td>41</td>
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<tr>
<td>2015</td>
<td>693</td>
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<td>2016</td>
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<td>2017</td>
<td>1001</td>
<td>399</td>
</tr>
<tr>
<td>2018</td>
<td>1118</td>
<td>391</td>
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</table>

ROBUSTNESS • Diversity of contributors (segments and roles)

<table>
<thead>
<tr>
<th>CONTRIBUTIONS</th>
<th>COMMUNITY</th>
<th>Mozilla staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
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<td>71</td>
</tr>
<tr>
<td>2013</td>
<td>50</td>
<td>41</td>
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<td>2014</td>
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<td>20</td>
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<tr>
<td>2015</td>
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<td>2017</td>
<td>158</td>
<td>62</td>
</tr>
<tr>
<td>2018</td>
<td>210</td>
<td>75</td>
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</tbody>
</table>

ROBUSTNESS • Networkers between projects

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>ONLY ACTIVE CONTRIBUTORS</th>
<th>5 YEAR ACTIVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>0</td>
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</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
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<tr>
<td>2016</td>
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<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

PRODUCTIVITY • Amount of contributions on GitHub/Git

<table>
<thead>
<tr>
<th>YEAR</th>
<th>commit</th>
<th>issue</th>
<th>pull request</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>200</td>
<td>500</td>
<td>300</td>
</tr>
<tr>
<td>2016</td>
<td>300</td>
<td>700</td>
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<td>2017</td>
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<td>900</td>
<td>600</td>
</tr>
<tr>
<td>2018</td>
<td>500</td>
<td>1100</td>
<td>800</td>
</tr>
</tbody>
</table>

PRODUCTIVITY • Lead time for pull requests and issues (GitHub/Git)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Average lead time</th>
<th>Pull requests</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>2016</td>
<td>10</td>
<td>200</td>
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<td>2017</td>
<td>15</td>
<td>300</td>
</tr>
<tr>
<td>2018</td>
<td>20</td>
<td>400</td>
</tr>
</tbody>
</table>

DATA
Includes only non-staff contributors with more than 5 contributions (staff excluded)

TIME PERIOD
2017-2019
Summary

**ROBUSTNESS**

By Mozilla network engagement: There is no particular cohesion between WebMR contributors and other Mozilla projects. The contributions are coming from both staff and non-staff.

By external network engagement: The WebMR work seems well embedded in an ecosystem of other open source frameworks and tools.

By attraction and retention: WebMR is a relatively community-driven project, with almost half of contributions coming from non-staff. The community continues to grow, although slowly. Retention is difficult to assess in such a small community; however, the early years were highly successful in keeping the contributors engaged, and retention has since dropped off – but is still respectable as compared to other projects.

By user diversity: contributions are equally coming from casual, regular and core segments.

*What counts as a contribution? Contributions from GitHub/Git and Kitsune*

**NOTES TO THE NETWORK**
The network includes all contributors who have more than 5 contributions to WebMR (only non-staff).

**TIME PERIOD**
2017-2019

**COLORED NODES**
Contributors with more than 5 contributions to WebMR, colored by segment.

**NODES WITH LABELS**
Projects with more than 5 WebMR-contributors.

**KEY FIGURES**
*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019.*

- **CONTRIBUTORS**: 125
- **CONTRIBUTIONS TO WEBMR**: 7,247
- **CONTRIBUTIONS ACROSS THE MOZILLA PROJECT**: 21,232
Community health

WebMR

Robustness • Attraction and retention of contributors

- Data includes only non-staff contributors with more than 5 contributions (staff excluded)
- Time periods: 2017-2019

- **Attraction rates**:
  - 2013: 5 (5%)
  - 2014: 5 (1%)
  - 2015: 10 (0%)
  - 2016: 47 (0%)
  - 2017: 26 (0%)
  - 2018: 48 (0%)

- **Retention rates**:
  - 1 year retention:
    - 2014: 1 (100%)
    - 2015: 7 (53%)
    - 2016: 2 (51%)
    - 2017: (40%)
    - 2018: (40%)
  - 2 year retention:
    - 2015: (60%)

---

Robustness • Diversity of contributors (segments and roles)

- **Share of contributors and contributions**:
  - 2013: 18 casual, 44 regular, 38 core
  - 2014: 42 community, 58 Mozilla staff
  - 2015: 73 casual, 16 regular, 11 core
  - 2016: 75 casual, 25 regular

- **Share of bridgers from segments**:
  - Core: 14
  - Regular: 30
  - Casual: 67

---

Robustness • Networkers between projects

- **Number of contributors and contributions**:
  - 2013: 50
  - 2014: 51
  - 2015: 53
  - 2016: 26
  - 2017: 48
  - 2018: 48

---

Productivity • Amount of contributions on GitHub/Git

- **Gecko | GitHub/Git activity**
  - 2013: 5
  - 2014: 10
  - 2015: 10
  - 2016: 7
  - 2017: 26
  - 2018: 48

- **Number of contributions**
  - 2013: 55
  - 2014: 47
  - 2015: 47
  - 2016: 47
  - 2017: 47
  - 2018: 47

- **Productivity**
  - 2013: 5
  - 2014: 10
  - 2015: 10
  - 2016: 7
  - 2017: 26
  - 2018: 48

---

Productivity • Lead time for pull requests and issues (GitHub/Git)

- **Average lead time**
  - 2013: 5
  - 2014: 10
  - 2015: 10
  - 2016: 7
  - 2017: 26
  - 2018: 48

- **Average lead time**
  - 2013: 5
  - 2014: 10
  - 2015: 10
  - 2016: 7
  - 2017: 26
  - 2018: 48

---

Data includes only non-staff contributors with more than 5 contributions (staff excluded).
Community health

DeepSpeech

Summary

ROBUSTNESS

By Mozilla network engagement: There is no particular cohesion between WebXR contributors and other Mozilla projects. The contributions are coming from both staff and non-staff.

By external network engagement: The network shows which other projects contributors to DeepSpeech also engage in. Here especially Common Voice is the main project, in fact, the people contributing to Deep Speech make more contributions to Common Voice (seen on the size of the label).

The Deep Speech project is like DevTools, made up by both staff and non-staff, but with staff making the most contributions.

Most of the contributions are made by either core or casual.

All regular and core contributors active on Deep Speech are also active on other projects.

What counts as a contribution? Contributions from: GitHub/Git

KEY FIGURES*

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019

44 CONTRIBUTORS

701 CONTRIBUTIONS TO DEEPSPEECH

7,536 CONTRIBUTIONS ACROSS THE MOZILLA PROJECT

NOTES TO THE NETWORK

The network includes all contributors who have more than 5 contributions to Deep Speech (only non-staff).

TIME PERIOD

2017-2019

COLORED NODES

Contributors with more than 5 contributions to Deep Speech, colored by segment

NODES WITH LABELS

Projects with more than 5 Deep Speech-contributors
Community health

DeepSpeech

ROBUSTNESS • Attraction and retention of contributors

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ATTRACTION</th>
<th>RETENTION</th>
<th>CORE</th>
<th>REGULAR</th>
<th>CASUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>23</td>
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DATA
Includes only non-staff contributors with more than 5 contributions (staff excluded)

TIME PERIOD
2017-2019

ROBUSTNESS • Diversity of contributors (segments and roles)

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<tr>
<th>CONTRIBUTIONS</th>
<th>COMMUNITY</th>
<th>MENTOR</th>
<th>STAFF</th>
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<tr>
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<td>38</td>
<td>14</td>
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<td>0% - 20%</td>
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<td>11</td>
<td>7</td>
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Community health

Common Voice

Contribution of sentence validation and voice recordings (open source code contributions follow)

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2017-2019

ROBUSTNESS • Networkers between projects

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Sentence validations, recordings, and users per month

Percentage of users returning each month

Total number of users per month

Users
**Community health**

**Common Voice**

**Summary**

**ROBUSTNESS**

By Mozilla network engagement: The network shows which other projects contributors to Common Voice also engage in. Here both Firefox, Web Properties and Add-ons / Web Extensions are the main projects.

The Common Voice project is very new and is mainly made up by non-staff contributors.

The majority of contributions are from the core, but also regular contributors make a relatively high share of the contributions.

We also find that many of its contributors are active on other projects as well, not only focused on Common Voice – especially the core contributors.

What counts as a contribution? Contributions from: GitHub/Git and Pontoon

**KEY FIGURES**

*Note that the overall numbers referenced below are across the history of the project, while the network graphs are just 2017-2019

396

Contributors

66,450

Contributions to Common Voice Infrastructure and Localization - This does not include Voice Contribution and Sentence Validation

1,083,885

Contributions across the Mozilla project

**NOTES TO THE NETWORK**

The network includes all contributors who have more than 5 contributions to Common Voice (only non-staff).

**TIME PERIOD**

2017-2019

**COLORED NODES**

Contributors with more than 5 contributions to Common Voice, colored by segment

**NODES WITH LABELS**

Projects with more than 5 Common Voice-contributors
Community health
Common Voice

ROBUSTNESS • Attraction and retention of contributors

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Survey Insights

Definitions of segments used when describing survey results:
- **Active**: have contributed to Mozilla or a related project in the last year.
- **Inactive**: have contributed to Mozilla or a related project longer than one year ago.
- **Never Active**: people who signed up for information but never interacted with Mozilla or a related project.

Employees are not included in the analysis.

The survey indicates most contributors are from Europe, which also has an unusually high rate of people who signalled interest but never participated (Never Active). Asia seems to have the most engaged contributors, with the unusually high rate of people who signalled interest but never participated. Employees are not included in the analysis.

By the numbers:
1,144 people answered the survey, as provided in English (81%), Spanish (6%), German (5%), French (4%), Portuguese (2%), and Arabic (1%). They hailed from Europe (44%), North America (25%), Asia (17%), South America (8%), Africa (3%), and Oceania (2%).

Most contributors were quite young: 60% were under the age of 35, with only 5% over the age of 54. Most respondents work full time. 8% said they have a disability.

10% of the respondents identified as a woman, whereas 78% identified as a man. 11% identified as non-binary/third gender or preferred to self-describe or just not disclose.

The survey results:
- **NEVER ACTIVE**: 46% 522
- **ACTIVE**: 41% 469
- **INACTIVE**: 13% 153

Survey respondents participated in a range of areas beyond just open source code focused projects. Only 22% of Active contributors said they only participated in Mozilla’s open source work. In-person events remain key to many contributors’ sense of community and participation: attending, organizing and speaking at events remain very popular, followed by coding, localization, social media sharing and documentation.

Firefox, Localization, and Common Voice were the most popular contributor communities amongst all Active participants, while Firefox, Common Voice, and Add-ons were, respectively, the most popular areas of participation for new contributors.

Encouraging the leap from interest to participation

It’s notable that even those Never Active – that is, those who signalled an interest in participating but never followed through – bothered to respond to the survey, suggesting a genuine interest in Mozilla’s work and the possibility of activating this group. 57% of this group were from Europe, with North America next (26%), followed by Asia (9%). This group was motivated by general interest (47%), to learn more about Firefox (44%), by Mozilla’s mission (39%), and to learn more about open source projects (32%) (multiple answers permitted). ‘Getting busy’ was one reason for not participating (51%), but not knowing how to start or what to do were ranked basically equal to busyness, indicating we need to better understand how these contributors’ initial experience didn’t provide them what they needed. Perhaps we don’t provide enough information designed for newcomers, or perhaps contributors couldn’t easily figure out where their skills would be best applied or what contribution opportunities would best meet their goals.

25% of the Never Active group were also younger than 25. This could indicate interest from students, perhaps particularly from Europe, who were unable to follow up.

Coding isn’t necessarily dominant: contributors participate in a range of ways, and in-person events remain popular.

There’s a significant gap in the security skills of those contributors we attract and those who actually participate. 20% of Never Actives also noted that they had skills in security, a category ranked after Coding (42%), QA/testing (28%), and Localization (23%). In contrast, Active and Inactive contributors rank ‘security’ as quite low on their list of skills. Again, not knowing how to start or what to do were cited as key reasons potential contributors didn’t actually make the leap. Are we not tailoring our contribution opportunities well enough for new contributors with security skills?

Most contributors work full time. 8% said they have a disability.
Understanding the Rebel Alliance

Contributors are generally positive about their experiences and very motivated by Mozilla’s mission.

Most respondents that their contribution experience was extremely positive or positive (84%), with 11% neutral and 5% saying their experience was negative or extremely negative. Firefox had the most participants with negative or extremely negative experiences (15%), followed by Thunderbird (9%) and Mozilla.

Regional/local communities (7%). For those who had negative experiences, their main motivations were social impact, networking, and self-improvement. However, it’s difficult to interpret much from these results without further inquiry. For example, the higher negative experience rate for Firefox could simply be because Firefox had the most survey respondents, and the negative responses might have little to do with the experience not matching motivations.

Contributors are largely motivated by Mozilla’s mission, along with self-improvement.

CATEGORIES INCLUDE:

• Self-improvement Goals: To build my skills and experience, to build my resume/CV, as part of my job/academic, to learn new things
• Networking or Community Goals: To build my professional network, to build my social network, to belong to a community
• Tangible Goals: To have fun, to make cool stuff/express my creativity, to work on a particular technology
• Social Impact Goals: To advance the mission of Mozilla, to have a visible impact on the world
• Other: Other

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Contributors are largely motivated by Mozilla’s mission, along with self-improvement.

CATEGORIES INCLUDE:

• Self-improvement Goals: To build my skills and experience, to build my resume/CV, as part of my job/academic, to learn new things
• Networking or Community Goals: To build my professional network, to build my social network, to belong to a community
• Tangible Goals: To have fun, to make cool stuff/express my creativity, to work on a particular technology
• Social Impact Goals: To advance the mission of Mozilla, to have a visible impact on the world
• Other: Other
Most contributors leave for personal reasons, but also because they feel a lack of community or find contributing difficult. These are things we can fix.

Digging deeper into the reasons why people leave would help us understand what problems are soluble across all contribution areas and what are more project-specific. For example, we suspect that there are changes we might be able to make across all project areas to better support contributors as their lives inevitably change. Is it largely a matter of ‘task design’, and could we design tasks that better fit busy schedules? Or is that contribution opportunities aren’t as engaging once people have more competing demands, and can we address this? First, how we can maintain an ongoing relationship with these ‘alumni’ contributors and increase the likelihood of providing value and encouraging re-engagement later? Any improvements that help keep those who live busy to stay engaged might also help persuade those not Actives to take the leap into participation.

CATEGORIES INCLUDE:

- **Personal reasons:** I felt burned out, I got busy in my work or personal life
- **Lack of community:** I didn’t have enough contact with staff, I didn’t know if my contributions were having impact, I didn’t have enough contact with other volunteers, I didn’t get recognised for my contributions
- **Disagreement:** I was discouraged by negative behaviours/deficiency, I didn’t agree with how things were run, I didn’t feel aligned with Mozilla’s values anymore
- **Lack of help:** I didn’t know where to start, I found the contribution tools/software hard to use, I didn’t know what to do, I didn’t have enough resources available, I couldn’t contribute in my language
- **Other:** I didn’t find the work interesting anymore, Other

Contribution to other open source projects is an opportunity for cross-project collaboration and alignment, but it also means there is competition for limited time.

The survey confirmed that approximately 80% of Active and Inactive contributors work on other open source projects. This gives Mozilla potentially influential connections across the open source ecosystem, a point that was also confirmed in the quantitative review of cross-repository contribution (two earlier section on External Influences). Again, there’s value in better understanding these connections and what motivates those contributors who participate in Mozilla communities as well as other open source projects.

However, this also means there is competition for contributor attention and time. For those Never Actives who signed up to participate but never followed through, what was problematic in their initial experience with Mozilla, and could these issues be addressed?

For further research:

- What motivates those contributors who participate in Mozilla communities as well as other open source projects?
- For those Never Actives who signed up to participate but never followed through, what was problematic in their initial experience with Mozilla, and could these issues be addressed?

In 2019, the Open Innovation team worked with the DevTools team to research the challenges technically skilled working women faced in contributing. We learned that leadership opportunities were in high demand by women, as they help further career goals, yet these opportunities also felt the most out of reach. Too often, open source communities default to believing in the meritocratic narrative that everyone must start at the beginning and earn their role. Unfortunately, this is a false narrative of a path to equality: not everyone starts from the same set of advantages and therefore might not have the time to generate the volume and time investment needed to ‘work up the ladder,’ despite the quality of their more limited contributions. For example, a working mother might have fantastically thoughtful contributions, but with limited time to participate, she is less likely to reach leadership levels in projects that still work with an unattainable meritocratic ideal in which volume and time matter. The DevTools team actually needed more leadership-level contributions. More pull requests and issues were coming in, and there was a growing need for more patch testing and question and answer.

To match product team needs to value for contributors, the Open Innovation team ran a four week Open Source Maintainer course that introduced a cohort of non-male technical contributors to leadership opportunities in Debugger. The course brought in one new underrepresented community leader who has demonstrably helped the product team. Along with our basic checklist for improving diversity and inclusion in open source communities, this course gives us another useful tool in designing contributor communities for success.
The Rebel Alliance of Experts, Influencers, and Students

The analyses in this report strive to make visible the remarkable collection of individual volunteers and commercial contributors and the work they do to help Mozilla protect and promote the open web. However, there are numerous people and companies who help Mozilla in ways that aren’t as easily captured as a data point from a GitHub/Git repository. For example, how could we graph the experience and passion of our Mozilla Fellows, who help Mozilla stay abreast of cutting-edge developments in technology and its social impacts and help us think more creatively about problems and solutions? Or how could we adequately measure the market influence we gain by collaborating with allies in standards setting efforts? This section describes the essential expert, influencer and student communities in which Mozilla invests and who in turn help us accomplish more than we ever could on our own.

Fellowships, Awards, and Research

Fostering an influential network of Internet leaders through fellowships, award programs and research

The Mozilla Foundation recruits and supports internet activists around the world in our fight for a sustainable, healthy, human centered internet. By supporting these leaders through year-long Fellowships, we’ve fostered a powerful expert network of over 100 researchers and scientists, engineers, policy experts, and organizational partners that greatly extends our knowledge and reach. These remarkable leaders often work with NGOs and other web activists with areas of expertise to which we would otherwise have access – especially on the ground, local expertise. And while Mozilla Fellows often work with tools we understand well, like code and policy, they also use mediums we wouldn’t normally consider, like art and educational curricula, which help us reach new audiences and see problems and solutions in a new light. Their insights help advance our mission and, ultimately, build better products that empower users in the digital lives.

The Mozilla Foundation also makes direct, one-time financial investments in innovators through the Mozilla Awards program and promotes these innovations broadly through their networks and advocacy work. The Foundation’s annual Internet Health Report is a resource for the community. By the community: an open-source collection of data and original reporting about the state of the Internet. The Foundation’s grassroots advocacy, which helps Mozilla to reach audiences in which we’ve historically been unable to connect.

Together, 2,500 community members under one roof for a week each year.

In coordination with the corporate side of Mozilla, the Foundation also supports the Mozilla Open Source Support award program (MOSS), which recognizes groundbreaking, mission-aligned open source projects. In 2018, MOSS experimented with offering $5K in seed grants to 14 promising projects at MozFest and implemented guidelines to help improve its grantmaking diversity and inclusion.

Perhaps a result of this work, MOSS recently processed a record number of applications – most from outside the US - and gave nearly $1M USD in funding to over 40 open source projects. On the corporate side, the Mozilla Research Grant program helps us extend our expert network in universities, labs and research-focused registered non-profits. The program has a sharp focus on long term value to Mozilla, following a theory of change that investments help build the behaviors, influence, reputation, and inclusive innovation we need in that 2nd or 3rd time horizon: ‘Investments lay the groundwork so we can build the things we need in the future to keep the Internet safe, open, and accessible to all, as it evolves through time.

Since 2017, the research grant program has awarded approximately $1.6 m USD to 36 researchers to 26 universities. The program has worked hard to improve diversity in the research space by looking for early career academics and supporting parents by stipulating that 10% of grant money can be used for childcare.

I am confident that Mozilla was thinking about diversity when they created the Mozilla Research Grants program. As an early-career and female professor who had a baby in the middle of my MRG project, Mozilla’s flexibility as a funder helped me to achieve some life/work balance during the critical pre-tenure phase of my career.

TechSpeakers

Mozilla’s Tech Speakers program supports an international community of volunteers that engage developers and students around the globe through technical talks and workshops. The program recruits, and trains community members to give presentations about open web technologies, Mozilla, and Firefox. Since its inception in 2015, the program has grown to include 141 participants, representing 44 countries. Tech Speakers are selected from diverse backgrounds using a standardized set of criteria. Collectively, they are fluent in over 50 of the world’s most common spoken languages, which helps Mozilla to reach audiences with which we’ve historically been unable to connect.
VR/AR, Rust, and Mozilla and Open Source have been the most popular topics respectively since 2017. Progressive Web Apps (PWA) and the Distributed Web became topics of interest amongst Tech Speakers and their audiences in 2018, while Web Extensions and Web Assembly jumped in popularity.

The team has worked to improve gender parity by reaching out through channels popular with female programmers and better networking. In 2015, only one participant did not self-identify as male. In 2019, 64% identified as male and 36% as female.

Open Source Student Network: The next generation of Open Source contributors

Our 2017 report on contribution at Mozilla identified that the majority of volunteer contributors to our products and technologies were between the ages of 18-29 years and likely students. This understanding spurred us to deepen our investment in student communities through the Open Source Student Network (OSSN), a network for university and college Clubs across the US in which students learn about, create and contribute to open source projects. Mozilla helps OSSN members identify projects and find collaborators, mentorship and support. We also work directly with Club leaders to develop their skills and grow their Clubs.

| VR / AR / MR | 21.7% |
| RUST | 11.4% |
| WEBEXTENSIONS | 7.2% |
| LANGUAGES / FRAMEWORKS / LIBRARIES | 4.3% |
| DIVERSITY | 4.9% |
| OTHER | 8.3% |
| IOT | 4.7% |
| MOZILLA / OPEN SOURCE | 11.0% |
| WEBASSEMBLY | 3.6% |
| PWA | 2.7% |
| DEV TOOLS / DEVELOPMENT | 4.3% |
| HTML5 / GAME DEV | 1.6% |
| FIREFOX / QUANTUM / BROWSER | 4.0% |
| INFOSEC / PRIVACY | 2.3% |
| TYPOGRAPHY | 1.3% |
| CSS / GRID | 1.6% |
| COMPATIBILITY | 0.9% |
Open Innovation

Although there are countless definitions of innovation, we like the definition proposed by Clayton Christensen 25 years ago in *The Innovator’s Dilemma*: "...innovation is a change in the process by which an organization transforms labor, capital, materials, or information into products and services of greater value." In other words, innovation is more than ideation or invention: innovation is a change in the way an organization plans, makes decisions, and executes work.

Mozilla’s innovation potential is guided by our mission and our understanding of evolving user needs, as well as the open interplay with our rebel alliance.

Although there’s more to successful innovation, our open by design principles apply well here. In practice, this means Mozilla should:

- Understand how a product or technology can deliver value within a market and its ecosystem.
- Apply the right model of openness to bring our rebel alliance into our innovation and product development processes. The model should be designed to best develop and deliver this value.
- Work across the product lifecycle with external collaborators and contributors, including individual volunteers as well as organizational and commercial entities.

This contributed essays in this section highlight several examples in which these principles have come to life across Mozilla.
Common Voice: Stakeholder Perspectives

Common Voice is a great example of how Mozilla has employed open innovation and an open by design approach, from ideation and development through project maintenance and marketing.

Common Voice is a Mozilla-led crowdsourcing initiative that’s created a publicly available dataset of audio, transcribed in any language, that anyone can use to train voice-enabled applications. Launched in June 2017, Common Voice aims to democratize speech technologies through global collaboration with volunteers, developers, government agencies, academic institutions and researchers, and startups and established companies. Each stakeholder brings unique contributions to a valuable public resource that benefits everyone—and that none could build on their own.

**COMMUNITY IMPACT: FROM CONCEPT IDEATION TO CAPACITY SCALING**

In May 2017, Mozilla’s Machine Learning Group and the Open Innovation team gathered in Taipei with a group of community members to address an industry-wide challenge: how can we collect large quantities of voice data to support open source machine learning?

Generating large volumes of high-quality voice data is a common problem for all speech-to-text (STT) engines. To train a speech engine requires thousands of hours of voice data. The high cost of commercial datasets is a barrier to entry for most open source projects and developers.

We ran ideation and design sprint exercises to generate ideas and best practices around crowdsourcing voice data. These were presented as paper prototypes and guerrilla-tested on the streets of Taipei, ultimately leading to the Common Voice crowdsourcing project.

This launch is not the only example of how community members helped grow and shape the direction of the project over the past two years. Since the Common Voice team enabled multi-language support in June 2018, the process of launching new languages has been a completely community-driven process that has surpassed all expectations. From passionate volunteers to professional linguists, researchers, and students, a large community has enthusiastically rallied around the Common Voice crowdsourcing project.

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That is probably the most underestimated and least trivial component of the entire project. It takes millions of clips per language to train a production quality speech recognition engine. But that’s not all. In order to make the Common Voice dataset as useful as possible, the team decided to only allow source text that is available under a Creative Commons (CC0) license, meaning there is no copyright or other legal restrictions. Applying this standard means it’s more difficult to find and collect source sentences, but this requirement allows anyone to use the resulting voice data without usage restrictions or authorization from Mozilla.

In the early days, sentence collection was an immature process. Sentences were submitted through different channels (email, GitHub/Git, discourse, even instant messages...), which led to a heavy workload for staff and volunteers in maintaining quality. To address this issue, members of the Common Voice community built a tool to centralize the sentence collection and review process, automating the quality checks and establishing a workflow for peer-reviews.

Common Voice is an open source project with access points, contribution opportunities and self-evolved feedback mechanisms in many areas, both technical and non-technical.

"Common Voice is an open source project with access points, contribution opportunities and self-evolved feedback mechanisms in many areas, both technical and non-technical."

Mozilla community members participate in ideation exercises during the Taipei design sprint.
Fostering Research

We are a small cross-disciplinary research unit based at Bangor University, Wales, made up of linguists, termbolists and software developers. For many years, we have conducted projects that seek to apply a whole range of language technologies for supporting the Welsh language speaking community as well as to collaborate with other minoritized language communities. With the advent of Alexa, Siri and other intelligent speech interfaces, speech technologies for Welsh have been widely understood and accepted priority if Welsh speakers are to be able to participate in recent evolution of human computer interaction.

We began our work on Welsh language speech recognition in late 2014. Recognizing that we had no data, we developed our own crowdsourcing speech corpus (called ‘Paldaru’) app for iOS and Android. It received a good response, with hundreds of individuals contributing their speech into a corpus of 40 hours of Welsh speech which is available to all under a permissive creative commons license. The data was subsequently used to recognize questions for a small set of skills supported by a prototype Welsh language personal assistant. This also led to new resources being openly and permissively available on GitHub.

The first year of Welsh CommonVoice and DeepSpeech has shown it has motivated a community of volunteers, developers and other individuals in companies and organisations to engage and contribute efforts. As researchers and developers that are particularly close to this less-resourced language community, we have never observed this dynamic before. Its disruptive influence is exciting and we look forward to benefiting not only from more data, but from a community empowered for the first time to innovate and collaborate on solutions for local Welsh language speech related requirements and problems.

Delwyth Pris (l) Deiniol Bryn Jones (R)
Language Technologies Unit, Bangor University, Wales

Creating the ImageNet Dataset for Voice

Although the technology behind automatic speech recognition is over half a century old, new techniques are emerging to process speech. Progress in deep learning methods, the availability of ubiquitous computer power, and access to voice datasets to train AI systems to recognize speech, e.g., through recording help desk interactions or processing on-line videos, have helped make significant advances in speech recognition in recent years. Examples of popular automatic speech recognition use cases include:

- Voice Assistants like Amazon’s Alexa
- Natural language search like Google
- Question Answering like IBM Watson

Interest in natural language understanding and processing is now massive due to the ease with which humans interact through voice in many languages – enabling technology companies to reach bigger audiences worldwide through existing and new voice driven tools and technologies such as digital assistants, domain specific helpers (e.g., banking) and robots. You can see the relationship between the various elements of Natural Language Processing. Understanding & Automatic Speech Recognition in the diagram below entitled “NLU vs. NLP vs. ASR” that are needed in these tools. However access to high quality voice data is the essential ingredient for most aspects of ASR.

Some companies now dominate voice use cases through their popular technology, and are gathering relevant voice data in large quantities organically through the use of their tools. Naturally the bulk of the high quality voice data that is being accumulated in this way is unavailable as open source for use at universities and research institutions – nor is it available for use by industry and start-ups, other than possibly through negotiated contracts.

Corporations, as well as startups and individuals, are energized through the availability of high quality open datasets. A seminal example in visual object recognition is the ImageNet dataset created by researchers Fei Fei Li. The work on ImageNet started in 2006, and was followed by annual ImageNet based contests. In 2012 contest caused the tech industry to pay attention with contestants introducing innovations such as the use of GPUs and then extremely deep neural networks. It is time for open innovations in voice, with support and outreach for minor languages and dialects as well as popular languages – Mozilla’s Common Voice is a step in that direction.

Jim Sporer
Director, Cognitive OpenTech Group (COG), IBM Research

Terminology: NLU vs. NLP vs. ASR
Bridging the Web Compatibility Gap with a Holistic Approach

Web compatibility (or WebCompat) is a fundamental part of Mozilla’s strategy, reflecting the importance of a seamless experience for Firefox users as well as our ability to influence the web standards community.

Problems with web compatibility (the “WebCompat gap”) can make a user’s Firefox experience inferior to other browsers. This is perhaps most important in comparison to the market leading browser, Chrome.

Monitoring and addressing the WebCompat gap is difficult. The emergence of a single issue is often complex. Many different points within the developer and user flow can lead to compatibility breaks.

Since 2018, the Open Innovation, WebCompat and Data Science teams have worked together to improve the volume and quality of web compatibility data so users can have a better Firefox experience. The teams have designed and tested mechanisms to engage the developer and user communities to tackle web compatibility from different perspectives and time scales.

We spoke with Michael Taylor, Engineering Manager of Web Compatibility, about challenges and how the cross-team collaboration has opened new perspectives.

In layman’s terms: What is web compatibility and what’s causing the “WebCompat gap”?

It’s an interesting question, because I’m not convinced that that term means the same thing to all people. I’ve worked on this for about eight years now, and even to me it’s still hard to do the elevator pitch.

Let me try: The term “web compatibility” is frequently used by various teams inside Mozilla as a proxy for a range of issues that affect a user’s experience on the web in a browser that leads to a sub-par experience. This ranges from “this looks a little different” to I need to open Chrome to get my work done.” The root causes may stem from a combination of what will call internal factors, such as interoperability gaps, browser interventions, and performance issues — things we have in our hands. And then there are external factors, like developer mindshare, browser market share, competitor marketing efforts, etc. — things we don’t quite control.

You’ve been working on WebCompat for quite some time now. What are the main challenges?

Oh wow, where to start... Well, to a large extent, the obvious issues (i.e., things easily observed visually or detected by diffing screenshots of homepages) have been solved.

Many of the issues we struggle with relate to complex user interactions, problems a few clicks deep inside a page, or to issues — bugs or blind spots — within our own tooling to help us reason about compatibility issues.

Web Compatibility is work that has existed since the day that competing browser engines entered the market. It’s not a problem that can be solved entirely in a quarter or two, or ignored as unimportant. Even if we can successfully solve all the technical issues within our control, we can still end up with WebCompat issues.

It feels like an uphill battle in a lot of ways. But most problems worth solving are an uphill battle ...

... an uphill battle with limited resources?

Yes, it’s a big problem given what we’re trying to tackle. You can’t solve everything. You have to prioritize and focus on where you can have the most impact.

There’s a small group of very active community members, pre-release users, who help to file bugs. They are doing a tremendous job, but the process doesn’t work at scale.

Web compatibility is a really interesting area to work on, because it’s challenging and complex. At the same time it is a very tough area to attract contributors, because it’s not glamorous.

If you’re really excited about shipping code and winning and having something for your CV - this is not the job for you. You have to be motivated by the greater good, the long term success, when the work we’re doing today is going to make a huge difference.

In 2018, you started working with Open Innovation and other teams within Mozilla, like Data Science and the Mozilla Developer Network (MDN) conducting experiments and SHIELD studies. Could you shed some light on what you did?

It started with an interesting pivot of the notion what “contribu-tions” are. There is a traditional Mozilla sense focusing on individual contributors, dealing with bugs, writing code and fixing things. But if you’re trying to understand where the Internet is broken in Firefox, you have to think at scale.

So we asked ourselves, is it possible to prompt Firefox users to help us? Can we find ways to get as close to the large release population as possible and can we prompt them to report bugs for sites that they really care about.

We learned a lot, and there’s some pretty detailed documen-tation of the iterations of the Blipz experiment, through which we tried to enhance the user experience for report-ing issues. That process started a really cool collaboration between the Open Innovation and Data Science teams with whom we’re trying to improve both the volume as well as the quality of the data that we use to address and measure web compatibility.

We’re also exploring automation for categorization of incoming bugs. Imagine we had five times the bugs coming in - 2000 to 3000 bugs a day. That would be incredible and terrifying. Creating opportunities and workflows for crowd-sourcing contributions to certain aspects of bug triage could be a solution, which Open Innovation is evaluating. They’re also exploring how machine learning and fuzzing can help identify WebCompat and interoperability bugs we don’t know about, which is quite exciting.

“Getting outside input has unlocked some new thinking. Rather than making more T-shirts or more stickers and trying to make people like us, let’s change our notion of what it means to contribute to this WebCompat effort.”

Would you say there has been a change of perspective in tackling the WebCompat gap?

Yeah, I think so. In many ways, a lot of the work that we do in our day to day is very reactive. People experience issues, we triage them, try to find a solution and then we put a bandaid on to stop the bleeding. And that’s important. But in order to solve a multi-front problem, you need to be proactive instead of just fixing symptoms. Open Innovation added ideas and skills to the pool that we didn’t have or simply lacked time for: ideation, prototyping, UX resources. Getting outside input has unlocked some new thinking. Rather than making more T-shirts or more stickers and trying to make people like us, let’s change our notion of what it means to contribute to this WebCompat effort. Make it easier, work systematically, learn from data, make small but impactful tweaks. And if we can get great results that way, it would be a pretty novel and cool thing.

In an ideal world - what sort of alliances would you envision to close the WebCompat gap?

That’s a great question and I don’t know the perfect answer to that. What I think is very powerful is education.

Education and outreach efforts are important to teach people the vision of why we should use web standards and why multiple web rendering engines are good for them, even though it makes their life a little more complex.

If all we want is for websites to work, that’s the most impor-tant thing to us, we should just switch to Blink. Do exactly what Edge did – they said the number one reason they switched was for web compatibility problems – and different-iate on UX features or services or something like that. But that’s not very interesting to me.

Mozilla has a vision for the open web, and one of the most powerful ways we have to influence that is to main-tain the independent implementation of Gecko. If we truly believe that having an independent web rendering engine is important, we have to make it easier to contribute, and we have to align allies in certain ways, be it on grassroots or enterprise level.

“If we truly believe that having an independent web rendering engine is important, we have to make it easier to contribute, and we have to align allies in certain ways, be it on grassroots or enterprise level.”
Community-powered Customer Support

Delivering great products doesn’t stop at release. Listening to our users and delivering timely and accurate support is crucial to ensuring our users have the best customer experience and that we continuously learn how to improve our products.

As a non-profit open source organisation, Mozilla has always succeeded through its network of great contributors. And the same goes for our customer support, which has been successfully driven by our community for over 10 years. Mozilla would not be able to support all its products without the efforts of our community. Every year, over 3,000 contributors help answer questions from the approximately 1 million users who come to support.mozilla.org for help every day (on average).

Maintaining a functional support service for multiple products at this scale is a complex challenge. With the help of our community, we cover three global support channels: our huge forum support and our social media support on Twitter. Our core community is colorful and diverse, ranging from a Silicon Valley-based IP attorney who built his own tools and templates to answer questions on the support forum during his spare time to the university assistant from Palestine who localizes support content in Arabic and helps women in her region develop IT skills.

Besides daily maintenance, the work of our community revolves around numerous, complex product releases: getting the help content ready, making sure all new content and updates are localized, and creating briefings on release notes, new features and possible known issues. More importantly, the community really comes together around release dates, ensuring support is available for the large volume of incoming questions. They do this by monitoring forums and social media, responding quickly, helping by reporting on common issues and bugs as well as by gathering insights and reporting back to our product teams.

Our global and multicultural community ensures that there is someone ready to answer your questions on support.mozilla.org 24/7, and most likely in your local language.

The work doesn’t just revolve around delivering support, but also on how we ensure we future-proof our support services. The team has been working on many new programs that both explore how we deliver proactive support and how we can support our users across diverse platforms and channels.

One new program is our RESPOND tool, which allows support community members to respond to Google Play Store reviews. To ensure quality control, the system sends each response to be vetted by three other volunteers, who look at it from the perspectives of accuracy, solution, and quality. This ensures our contributors can respond to users where they are with a community-managed high level of quality control.

Our MVP was a great success, and the team is getting ready to roll out a new and improved version of the tool. The longer-term plan is to expand this tool to deliver support beyond Twitter and our forums, responding to our users wherever they may be asking for help.

Policy and the Rebel Alliance in India and Kenya

In India, we’ve seen Mission-Driven Mozillians support and grow our campaign to make privacy real in the lives of 1.3 billion Indians. The Open Innovation, Policy, and Advocacy teams have worked together to drive campaigns advocating for strong data protection law in India and raising levels of privacy and security awareness in local communities.

In February 2018, more than 1,000 members of Mozilla’s India communities co-signed an open letter, with executive chairwoman Mitchell Baker, demanding that the current draft of India’s data protection law be strengthened. It was published as a full page advertisement in Hindustan Times, catching the attention of the public, as well as regulatory officials in New Delhi. More recently, in August 2019, the communities ran a postcard campaign in which more than 1,000 community members sent hand-written postcards to Members of Parliament asking them to stand up for privacy and make sure the data protection act got the discussion and debate it deserves. This is in addition to the ongoing work of several regional communities that regularly hold privacy awareness workshops in their schools, colleges and local neighborhoods using content they create themselves. In other ways, Mozilla has also supported the development of a broader privacy movement in India through events and public writing on the issue. On 24 August 2019, Mozilla co-organized a public meeting for privacy advocates across the country to celebrate the second anniversary of India’s landmark Puttaswamy case, which reaffirmed that all Indians are guaranteed a fundamental right to privacy. Mitchell Baker and Edward Snowden sent personal messages to mark the event.

Kenya

The Mozilla Policy Team has been working closely with the Government of Kenya as well as civil society and private sector allies to influence the country’s first data protection bill. This legislation would help to define the relationship between 50 million Kenyans and the government agencies and companies to which they entrust their data.

In May 2019, Mozilla’s Policy and Legal Teams partnered with the Technology Service Providers of Kenya (TESPOK) to conduct a series of workshops in Nairobi around Mozilla’s Lean Data Practices initiative. The workshops brought together TESPOK member companies’ executives and lawyers, government officials, and civil society activists to think holistically about the decisions they make with the data they have, discuss practical ways to safeguard user data, and explore how to implement many of the provisions in the Kenyan Data Protection Bill.

Encouraging companies to think through the key concepts in the draft data protection bill and the topics the proposed data protection regulator will likely focus on, we introduced the basic tenets of LDP:

- staying lean by focusing on collecting only the data that is needed
- building in security appropriate to the data collected
- engaging users to help them understand how their data is used.

Discussing these principles helped companies think about how to critically evaluate their data needs, ensuring that they stay lean by collecting only what is essential for conducting business, which would also help mitigate against vulnerabilities and potential breaches. Ultimately, data collected is data at risk. All participants said that they would make changes to their data processing practices following the workshop.

Good privacy practices are not limited to compliance, and this is why Lean Data Practices also encourages companies to engage their users by clearly explaining their data practices, making their privacy policies clear and more accessible, as well as creating awareness and educating users regarding their privacy policies. Increased transparency will create more trust with users and assure regulators that data collection is done in a way that respects user rights.

While Kenya’s data protection bill has yet to be passed, one of the key goals of this legislation is to push companies to think critically about their data needs before they collect and store user data. Lean Data Practices will help many Kenyan companies do just that.

MADALINA ANA
Senior Project Manager
SUMO

PATRICK MCCCLARD
Global Support Manager

RINA TAMBO JENSEN
Director Design & Product, Open Innovation

JOCHAI BEN-AVIE
Head of International Public Policy
General Information
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We are also appreciative to everyone across Mozilla who helped bring this report to life. Special thanks to Jochai Tal, and with whom we collaborated in creating the open source health framework along with Analyse & Tal, and whom we also worked on the 2017 communities and contributors report. This year, we expanded the collaboration to include Analyse & Tal, an employee-owned, co-operativist data analytics and visualization firm.

The quantitative analyses were based on data sources related to the development of Mozilla products and technologies from five different contribution platforms: GitHub/Git, Bugzilla, Kitune (Support), Pontoos (Localization), Kuma (Mozilla Developer Network), and the Add-ons database. It does not include Mercurial repos not mirrored in GitHub/Git, which are mainly related to Localization.

We were unable to cross-validate of results from the qualitative research methods. Ideally, we’d use mixed methods for a more comprehensive understanding of our matched data, and match identities.

Concerning contributor matching, our random sample was performed on two segments where we had identity information from SortingHat. In all, we had 4,563 contributors who matched these criteria, and our random sample test was performed on two segments where we had identity information from SortingHat.

We found that we had an affiliation accuracy of 89.7 percent, meaning only 10.3 percent of the sample had wrong affiliations, meaning they were community categorized as staff, or vice versa.

It was more common for non-employees to be falsely classified as staff, suggesting that the Mozilla community is a lot larger than our analyses indicate. However, this is not a significant impact.

For the qualitative survey respondents reflect their self-defined contributions around activity and is described further in the relevant section.

This report does not include all types of contribution across Mozilla. We are missing many aspects of contribution, some of which are more difficult to track and analyze, such as documentation and code reviews. Subsequent work could include these contribution types for a richer view of contributions and engagement across Mozilla’s contributor communities.

In 2017, we manually vetted our top 1,000 contributors to be sure we were accurate in both non-employees and employee/non-employee affiliation. This year, we built upon this dataset. Bitergia also helped us with cleaning up this dataset, using a more aggressive matching algorithm to remove a substantial number of duplicates.

To better understand the accuracy of our matched affiliations, a qualitative survey performed a qualitative check on assigned affiliations on a random sample. As the results would be most skewed by errors in the regular and core segment (due to the size of their contributions), the random sample was performed on two segments where we had identity information from SortingHat. In all, we had 4,563 contributors who matched these criteria, and our random sample test was performed on 10% of this subset.

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Data reliability: gender

Please see the section on Diversity and Inclusion for more details on the reliability of our quantitative analysis of gender.

Data reliability: categorization of contributions

Lastly, we worked with product teams and community managers across the organization to be sure we were looking at the right set of repositories and linking contribution from Pontoon (localization) and Kitsune (support) to the right products and projects. We did not include repositories we knew were dead or otherwise invalid (e.g. forks).

However, there are surely inaccuracies that need to be remedied in the future. Some of these are noted directly in the report, e.g. Firefox Android. In some areas, there were repositories that were hard to categorize in the timeframe we had for this report.

A note on the IT/Infrastructure and Web Properties contribution categories. These are both somewhat catch-all for GitHub/Git repos and Bugzilla issues that are related either to IT infrastructure, such as cloud-based services for Firefox, or content and code for some of Mozilla’s vast range of websites. Both of these categories should be better vetted in future reports to ensure a more accurate representation of Mozilla contribution. For example, non-employee contribution to some of the cloud-based services for Firefox might be better categorized as contributions to Firefox.

The GitHub/Git repos we viewed for this report and their categorization as well as cross-project mapping information are available upon request.

Mozilla’s External Network Influence

To create the network overview of contribution across Mozilla and non-Mozilla project repositories, we used the GitHub/Git API to determine which other public repositories Mozilla contributors participated in, as defined by issues, commits and pull requests. We only considered public repositories that had more than five unique Mozilla contributors within the time period 2017-2019. In total, we registered 3.1 million contributions, from 7,041 non-employee Mozilla contributors to 5,377 other repositories.

The network is colored by using a simple modularity cluster algorithm, which groups projects into 6 clusters based on which repositories contributors have been active. The white circles represent an individual repository, and the size of the circle and label indicates the amount of unique Mozilla non-employee contributors to that repository.

The yellow cluster represents projects which tend to be run by individuals rather than organizations. Here we also find a few Rust specific projects, but we also find Linux specific projects which border to the blue cluster.

The green cluster encompasses a wide range of web technologies and web development tools, such as node.js, react, angular, vue.js, npm, babel, webpack and bootstrap. We also find tools such as Visual Studio Code, Atom and Electron.

The blue cluster holds programming languages such as Go and Python, but also infrastructure projects such as Kubernetes and Ansible. On the edges of this cluster, we also find Homebrew and Travis, as well as ecosystems of repositories connected to operating systems.

The pink cluster includes web standardization work, including repositories from the W3C and the WHATWG community. The top of this cluster also holds different 3D and VR/AR repositories, such as three.js and gITF.

Finally, the purple cluster at the top is more or less an ecosystem of repositories around ember.js, although we also find Rails in this cluster.

Note that both analyses used a filter to avoid many small repositories, by defining that each repo included needed contributions from at least 5 Mozilla non-employee contributors within the examined time period.

Open source projects and health

The Open Innovation team partnered with Analyse & Tal to help us better understand the health of our various contributor communities. Their work has also informed Mozilla’s strategy to improve product support and localization. To bring in specific cross-industry expertise on open source, we also partnered with Open Tech Strategies, with whom we recently published a report on open source archetypes to help Mozilla and other organizations make informed decisions around open source goals, investment decisions, and tradeoffs.

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