Case Study: Unlock the Value of Open Source (Fannie Mae)

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Initiatives:Software Engineering Practices; Build a World-Class Software Engineering Organization

> Open source technologies and development practices drive innovation and developer engagement. To unlock the full value of open source, software engineering leaders at Fannie Mae embrace the principles of open-source development and promote contribution to open-source and innersource initiatives.

Company: Fannie Mae

Industry: Financial Services

Headquarters: Washington, D.C.

Revenue: $29.7B (2022)

Employees: 8,000 (2022)

Case Overview

Problem:

While most software engineering teams use open-source software (OSS) in their day-to-day work, software engineering organizations are often unable to realize the full value of open source. This is because they only leverage OSS on an ad hoc basis, and do not recognize the benefits of promoting contribution to open-source and innersource initiatives.

Action:

To unlock the full value of open source and build a culture of contribution to open-source and innersource initiatives, software engineering leaders at Fannie Mae:

- Drive buy-in on the value of open-source technology and development principles by designating ambassadors to promote the benefits to key stakeholders.

- Make open source seamless for developers by integrating tools and policies into developer workflows that facilitate open-source consumption and contribution.

- Foster a sense of community across team and organizational boundaries to accelerate collaboration and drive cultural changes that support open-source principles.

- Motivate developer participation in open-source and innersource initiatives by recognizing and rewarding contributors.

Results: Fannie Mae's systematic approach to making open source a strategic priority and motivating developer participation in open-source and innersource initiatives has improved developer engagement and driven greater innovation leading to increased delivery speed.

This case study is accompanied by an interview with John Mark Walker, Director of Fannie Mae's Open Source Program Office, who provides additional insights about the company's open source strategy from a software engineering leader's perspective (see Video Spotlight: Unlocking the Value of Open Source at Fannie Mae*). Please note the Video Spotlight may not be available as part of your current Gartner subscription. Contact an account executive if you wish to discuss expanding your access to Gartner content.*

Problem

Use of OSS is pervasive, with the majority of organizations using OSS components, tools, packages or libraries in some form for their development work.

Nearly all organizations use OSS within their mission-critical IT workloads, whether they are aware of it or not. It has been estimated that free and open-source software constitute 70% to 90% of any given modern software solution. [1]

Adopting OSS provides faster time to value, higher-quality software and access to key innovations. This is because the open-source development approach leverages a wider pool of contributors, who can test tools and components in real-life situations and share their feedback to improve the codebase. Additionally, the open-source approach can be leveraged for internal development and sharing of software assets — a set of practices known as *innersourcing* — to accelerate innovation and drive developer productivity and engagement.

However, software engineering leaders often fail to realize the full value of open source (understood here in terms of both open-source technologies and leveraging open-source practices through innersourcing). While most organizations consume OSS for faster software delivery, they often do so on an inconsistent or ad hoc basis, thus overlooking valuable use cases or newer and better open-source technologies. Furthermore, most organizations do not recognize the benefits of incentivizing contribution to open-source and innersource initiatives — such as enabling developers to work on new things, build their skills and shape the direction of key technologies. [2]

To fully realize the value of open-source development practices, software development teams must recognize the value of engaging reciprocally with the ecosystem they depend on. In other words, consuming open-source technology should only be part of the story; developers should also be contributing to open-source and innersource initiatives.

Fannie Mae recognized the potential benefits of open source for improving the value of their software solutions and driving greater developer engagement, and thus made open source a strategic priority. However, they realized they needed to drive greater participation in open-source and innersource initiatives across the development community. To address this challenge, Fannie Mae embraces the principles of open source-development — including collaboration, transparency and community support — to build a culture that encourages contribution to open-source and innersource initiatives.

Fannie Mae's Open-Source Journey

Fannie Mae realized that to unlock the full value of open source they needed to progress beyond ad hoc consumption to embrace open-source principles, and make contribution to open-source and innersource initiatives a central part of their culture. They aimed to build a culture of contribution, with teams actively collaborating across boundaries within their organization on innersource initiatives and with external open-source communities relevant to their needs and objectives (see Figure 1).

Our developers used open source to build apps but lacked a vision of where to focus their efforts. The first step for us was to understand risk and establish governance around OSS, but that wasn't enough. To drive developer productivity and skill-building, we further developed a culture of collaboration, and the open source world provides a model for that.

— *Linda Tai, Chief Technology Officer, Fannie Mae*

Figure 1: Fannie Mae's Open-Source Journey

Fannie Mae's Open-Source Journey
Illustrative
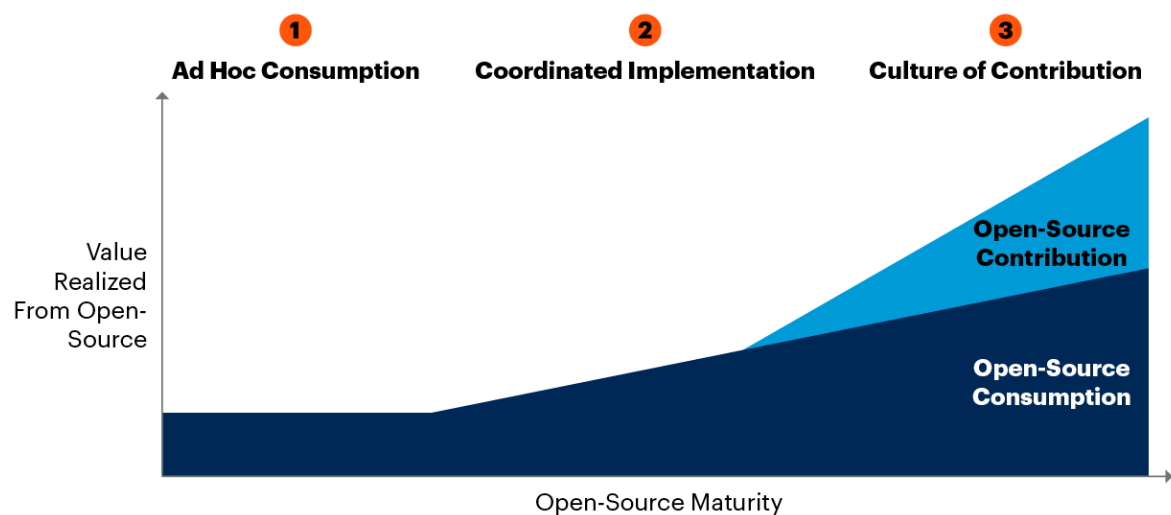
Source: Adapted From Fannie Mae
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Fannie Mae established an Open Source Program Office (OSPO) to provide visibility on the use of open source across the organization and coordinate implementation. The OSPO began by establishing policies and frameworks to safely scale and manage OSS consumption. After establishing guardrails to mitigate risk and coordinate open source implementation, they began to look for ways to realize further value and leverage the potential of contribution to open-source and innersource initiatives (for more information about setting up an OSPO, see Best Practices for Setting up an Open Source Program Office).

Promote the Benefits of Open Source to Drive Buy-In

Designate ambassadors to socialize the value of participation in open-source and innersource initiatives and promote the benefits that key stakeholders care about most.

To encourage open-source contribution, Fannie Mae needed to socialize the value of open-source and innersource participation and promote the benefits across the organization. Since different stakeholder groups have varying objectives, Fannie Mae realized that it had to highlight the benefits that mattered most to each stakeholder group to get their buy-in.

Fannie Mae designates ambassadors to promote the benefits of open-source technology and development principles, and drive buy-in across the enterprise. Fannie Mae's open-source ambassadors are typically highly experienced engineers who are enthusiastic about open source and readily volunteer for the role. The role is a hat they wear rather than a dedicated position, and they undergo lightweight training on the OSPO's mission and the goals of its various initiatives. Ambassadors tailor their message to different audiences, focusing on three critical stakeholder groups (see Table 1):

Table 1: Messaging on the Value of Open Source Tailored to Different Stakeholders

Stakeholder	Messaging Used to Communicate the Value of Open Source
Senior Leadership	The approach to development is built on collaboration and peer support. Embedding these principles internally can drive down costs and make processes more efficient as staff learn to lean on each other to solve problems and fix bugs, reducing service tickets and support costs.
Team Managers	Empowering developers to build and improve upon open-source tools boosts delivery speed and efficiency. For example, resolving issues or supporting new feature requests for open-source initiatives enables developers to proactively address the issues that slow them down the most.
Software Engineering Team Members	Open-source tools and policies make developers' day-to-day work easier, improving developer experience and productivity. For example, ensuring that code and documentation are clear, open, and accessible; and aligning on how requirements are written makes it easier to collaborate across teams, reuse existing code and reduce duplication of effort.

Source: Adapted from Fannie Mae

Fannie Mae's open-source ambassadors also work closely with teams to help them adopt and better understand new open-source technologies. This further helps promote the benefits of open source, as ambassadors are able to disseminate success stories from across the organization.

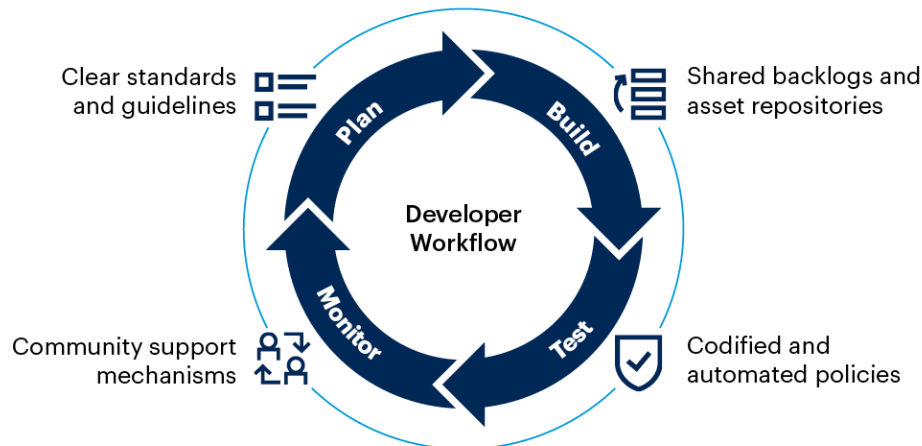## Integrate Open Source Into Developer Workflows

Make open source seamless for developers by integrating tools and policies into developer workflows that facilitate open-source consumption and contribution.

Fannie Mae recognized that to facilitate contribution to open-source and innersource initiatives, they needed to embed open-source principles like collaboration and transparency directly into their development practices. However, adopting these principles often demands changes to traditional workflows and practices; for example, it can require new tools for collaboration and code review, or adopting different communication and documentation standards.

To minimize developers' effort to adapt to these changes, Fannie Mae integrates tools and policies that promote open-source principles directly within developer workflows by (see Figure 2):

1. **Establishing clear standards and guidelines** for code contributions and documentation requirements. This ensures that contributions are made to approved projects and do not disclose any of the company's intellectual property.

2. **Implementing shared backlogs and asset repositories** to drive collaborative development. This allows teams to easily share and collaborate on code, promoting reuse and accelerating delivery speed.

3. **Implementing codified and automated policies** to ensure compliance with security and licensing rules. This ensures that developers only engage with approved open-source initiatives, mitigating risks from security vulnerabilities and open-source licensing requirements.

4. **Providing access to community support** to accelerate problem solving and innovation. This allows developers to get help and feedback from a wider community, which can help to improve code quality and delivery speed.

Figure 2: Integrate Open Source Into Developer Workflows

Integrate Open Source Into Developer Workflows

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One of Fannie Mae's OSPO's first initiatives was an innersource program, which addressed several aspects of integrating open-source principles into developer workflows and allowed them to more quickly align and scale best practices for contribution to open-source initiatives. Fannie Mae built an innersource portal to provide teams with visibility into what their peers are working on and drive the standardization and community engagement necessary to a culture of contribution (for more information on innersourcing, see Drive Innovation by Enabling Innersource).

> We started our innersource journey with one of our libraries for log standardization. Immediately, the innersource model enabled cross-organizational collaboration and delivering functionality more efficiently. This model enables the team to bring innovative ideas to the table, maximize adoption, and enhance developer productivity.
>
> — *Gayatri Mantrala, Software Engineer, Fannie Mae*

Fannie Mae's approach to integrating open source into existing developer workflows makes both open-source consumption and contribution a seamless and natural part of developers' day-to-day work. In addition to improved code quality and delivery speed, their approach makes core open-source principles like collaboration, transparency and community support an integral part of the software organization's cultural DNA.
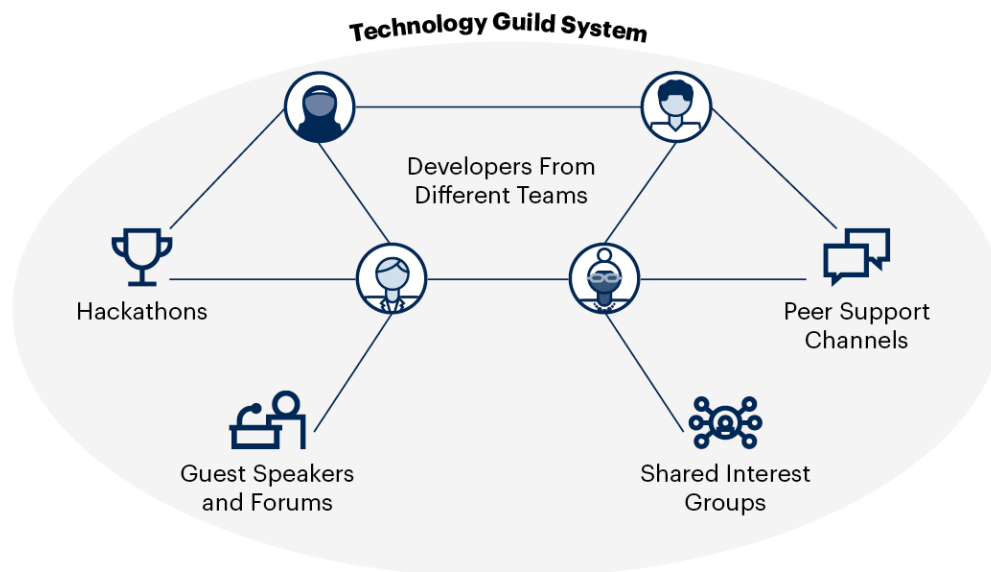
Build Community Around Open-Source Principles

Foster a sense of community across team and organizational boundaries to accelerate collaboration and drive cultural changes that support open source.

Fannie Mae realized that a culture of contribution to open-source and innersource initiatives requires developers to collaborate across teams and enterprise boundaries to leverage each other's work. Thus, Fannie Mae accelerates collaboration and enterprisewide participation by fostering a culture that encourages developers to connect on shared interests, support and contribute to each others' projects, and stay current on new initiatives.

Fannie Mae established various technology "guilds" focused on different skills and domains. Their technology guild system reinforces open-source principles and provides visibility on open-source initiatives across the organization via several mechanisms (see Figure 3):

- **Shared interest groups** dedicated to specific technical domains help developers stay current on new trends and capabilities from open-source tools and communities

- **Peer support channels** emulate open-source community principles by encouraging developers to lean on peer support to solve problems, rather than submitting help desk tickets

- **Hackathons** help build momentum for innersource projects by bringing people together who may not typically contribute

- **Guest speakers and forums** inspire developers and drive greater engagement with open-source tools and communities by exposing developers to new technologies and practices

Build Community Around Open-Source Principles

Technology Guild System

Developers From Different Teams

Hackathons

Peer Support Channels

Guest Speakers and Forums

Shared Interest Groups

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By fostering a sense of community based on open-source principles, Fannie Mae motivates developers to participate in open-source and innersource initiatives by connecting them to opportunities and peer support across team and organizational boundaries. The community creates a vibrant culture of collaboration and knowledge-sharing that makes developers feel supported to pursue creative ideas and innovative projects.

Recognize and Reward Open-Source Contributors

Motivate developer participation in open-source and innersource initiatives by recognizing and rewarding contributors.

To reinforce the importance of contributing to open-source and innersource initiatives, the next step in building a culture of contribution at Fannie Mae is to try and provide developers with concrete incentives for participation. Their existing efforts to promote the value of open source have already led to improvements in delivery processes and developer experience. They plan to build on this early success and drive even greater contribution to open-source and innersource initiatives by establishing a program to publicly recognize and reward developers' contributions. In keeping with the principles of open-source communities, the program may provide a way for developers to both receive and bestow recognition for contributions to open-source initiatives.

The incentive program will leverage gamification through leaderboards and a badging system. The leaderboards will highlight developer achievements and top contributors to various open-source and innersource initiatives, as well as allowing team members to stay informed on each other's projects. The badging system will recognize the contributions of developers or teams, which is designed to motivate others to contribute while building morale and a sense of shared goals among team members. The badges would also enable peers to easily see who they can learn from, as well as identify potential collaborators for future projects (see Figure 4).

Figure 4: Recognize Open-Source Contributors

Recognize Open-Source Contributors
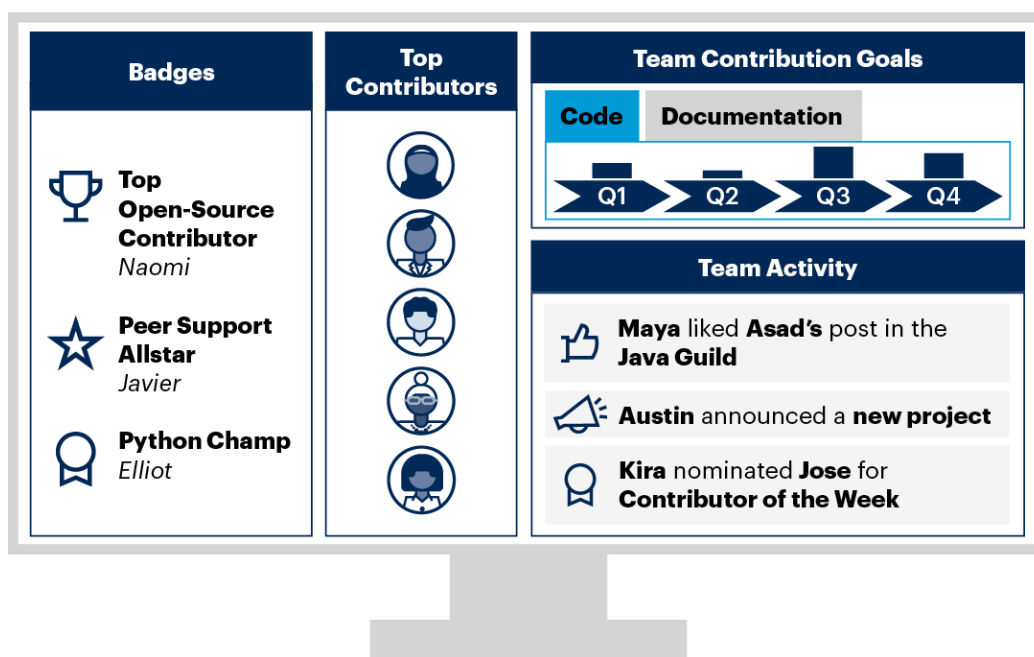
Source: Adapted From Fannie Mae
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Through publicizing open source and innersource contributions, Fannie Mae intends to provide a sense of healthy competition and visibility on developers' accomplishments, encouraging everyone to strive for excellence and improve their skills and performance.

Results

Since embarking on its journey to build greater open source maturity, Fannie Mae has driven innovation leading to improved delivery speed. Furthermore, by promoting participation in open-source and innersource initiatives, Fannie Mae has improved developer engagement and gained greater visibility on and influence over technology trends emanating from key open-source communities.

Innovation Driving Improved Delivery Speed

Fannie Mae launched their own open-source initiative to reduce delivery friction caused by security scans — the "Clean Dependency Project." The Clean Dependency Project leverages the open-source contribution model to patch security vulnerabilities in critical OSS libraries that lack "clean" upgrades. Prior to launching the initiative, security scans may have produced false positives and required an exception process before moving forward. This process possibly resulted in a delay in development.

OSPO ambassadors promoted the initiative, highlighting the benefits it could bring and providing clear guidance that made it easy for developers to contribute. Since their first internal release — a more secure version of the Python Pandas library — teams have been able to continue their work unimpeded by using the more secure, compliant, Fannie Mae-released version of the library.

Improved Developer Engagement

Additionally, Fannie Mae has found that encouraging developers to engage with open-source communities and contribute to innersource projects has improved developer engagement. Open-source communities are typically at the leading edge of innovation in the software engineering space, and developers want to work with the best tools and participate in that innovation. Developers at Fannie Mae found that contributing to these communities, as well as innersource projects, allowed them to learn new skills.

A further benefit of increased developer engagement with open-source communities is that it enables Fannie Mae to proactively identify and direct technology trends emanating from key open-source communities specific to their industry.

> By actively participating in influential open-source communities, we can proactively drive the technology roadmap as opposed to being on the receiving end of them. This is difficult to quantify but extremely important — having a seat at the table yields tangible benefits, such as visibility into software trends and an opportunity to drive the direction of those trends. The goal is to deliver more business value quickly and at scale. What we learned is that embracing open-source contribution is the best means to achieve that.
>
> — *Linda Tai, Chief Technology Officer, Fannie Mae*

Recommendations

To realize the full value of open source and build a culture of contribution to open-source and innersource initiatives, software engineering leaders should:

- Drive buy-in from the software engineering organization on the value of participation in open-source and innersource initiatives by designating ambassadors to promote the benefits to key stakeholders.

- Integrate tools and policies into developer workflows that facilitate both open-source consumption and contribution.

- Build a sense of community across team and organizational boundaries to accelerate collaboration and drive cultural changes that support open source.

- Motivate developer participation in open-source and innersource initiatives by recognizing and rewarding contributors.

Evidence

This case study is based on a series of interviews with the director of Fannie Mae's Open Source Program Office, as well as reviews of internal documentation provided by the company.

[1] A Summary of Census II: Open Source Software Application Libraries the World Depends On, The Linux Foundation.

[2] The 2023 State of Open Source Report by OpenLogic and The Open Source Initiative indicates that only 15% of large organizations and less than 9% of small organizations have innersource programs.

Recommended by the Authors

Best Practices for Setting Up an Open-Source Program Office

How to Create and Enforce a Governance Policy for Open-Source Software

Drive Innovation by Enabling Innersource

A CTO's Guide to Open-Source Software: Answering the Top 10 FAQs

3 Steps for Assessing an Open-Source Software Project

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