



Value Capture Dynamics in Open Source

Dawn Foster^{ID}, Independent Consultant

Matt Germonprez^{ID}, University of Nebraska Omaha

This article discusses the evolving vendor dynamics in open source projects that create tension between vendors and cloud providers as they seek to capture value while also creating friction and disruption for users and contributors.

With the rise in popularity of large cloud providers, the way that many people use open source projects has evolved with more people choosing to use open source services provided by large cloud providers, like Amazon Web Services (AWS), Microsoft, and Google. This allows

the cloud provider to capture value associated with using open source software, even when the cloud provider is not deeply involved in those open source projects.^{1,2} Some of the services that cloud providers offer stem from open source software projects owned and controlled by vendors that employ people to build and maintain the software while capturing their own value when selling products and services based on those open source projects. This can create a tension between cloud providers and vendors who both capture their own value around a single piece of open source software, what we refer to as a tension in the open source value capture dynamic.

When this tension results in vendors losing revenue at the expense of cloud providers profiting from vendor-related open source work, changes in the open source value capture dynamic may result.

Tensions in the open source value capture dynamic have resulted in some vendors deciding to move their open source projects under more restrictive licenses that are not recognized by the Open Source Initiative (OSI) as open source licenses or make other unilateral decisions on



FROM THE EDITOR

Commercial and, in particular, single-vendor open source firms are companies that provide some or all of their product under an open source license to the world. Increasingly, over the recent years, these companies decided to change the license going forward, often to a non-open source license. This article by Foster and Gernonprez analyzes the situation from the perspective of the affected user community of the (no longer) open source software. Happy reading and stay healthy!

behalf of the project that are designed to increase profitability for the vendor. These vendor changes can make it more challenging for the cloud providers and other users to capture value from these open source projects. In some cases, these vendor decisions have resulted in hard forks (also called hostile forks or variant forks) created by and maintained by cloud providers.

VALUE CAPTURE DYNAMICS

For open source projects that are owned and controlled by vendors, often referred to as “single-vendor open source,”³ the controlling vendor can often make unilateral decisions about the direction or governance of a project without consultation from other contributors and users. Examples of unilateral vendor decisions include moving a project to a non-OSI recognized license, shifting development to a private location, or restricting access to releases, which can change how others can capture value from that open source project. These unilateral, vendor decisions break the assumed social contract inherent in open source projects where there is an expectation of being able to continue to use, modify,

and contribute to the software indefinitely. Unilateral vendor decisions often feel like a rug pull, where the vendor has reneged on the promise of openness, leaving users and contributors to find other solutions, which might include a hard fork.

Prominent users of many vendor-owned open source projects include cloud providers (that is, AWS, Google, and Microsoft). As users, and value capturers of vendor-owned open source projects, cloud providers may experience disruptions due to vendor-led changes, and in some, but not all cases, vendor-led changes may result in a fork of the original project, which can fragment the community while providing alternative solutions for those capturing value from the original open source project prior to any change.

When vendors make unilateral changes to the open source projects they control, it can disrupt how, in our case, cloud providers capture the value of those open source projects, especially in the case of license change events where the new license prohibits the type of use that enables cloud providers to offer cloud services around the newly relicensed open source project. Because cloud providers provide the backbone for much of today’s modern digital infrastructure, they are quite sensitive to the impact of these vendor-led changes on their ability to capture the value from vendor-owned open source projects. As we next demonstrate, cloud providers have responded to these vendor-led changes by driving or becoming involved in the hard forks that result from changes.

VALUE CAPTURE DYNAMICS IN VENDOR-OWNED PROJECTS: LICENSING AND RESTRICTED ACCESS

Several cases exist that represent examples of where vendors have made unilateral changes to the open source

projects they control as they have moved projects under non-OSI recognized restrictive licenses (for example, MongoDB, Elasticsearch, Terraform, Redis) and restricted access to development, images, and/or releases (for example, Buoyant, Puppet, Bitnami). These are discussed along with resulting forks where available (for example, OpenSearch, OpenTofu, Valkey).

From a relicensing perspective, cloud providers including AWS capture value from open source projects, such as MongoDB without owning the underlying software because value capture occurs through complementary commercial capabilities rather than software ownership. In this, AWS derives private returns from open source by combining open source code with complementary assets, such as hosting, integration, support, and scale.^{1,4} AWS and their ability to offer MongoDB-compatible services is how AWS is able to monetize open source through digital infrastructure rather than ownership of the MongoDB project itself, as seen in AWS’s DocumentDB service being a fully managed MongoDB-compatible document database.

This value capture dynamic can inherently lead to tension between AWS and MongoDB (the vendor) as cloud providers may be capturing a disproportionate share of the value generated by MongoDB (the software). As literature suggests that greater control over the intellectual property and governance can improve a firm’s ability to capture value, this can help explain why vendors may believe their efforts are over-favoring downstream users of their software.⁵ In October 2018, MongoDB relicensed their open source project under the Server Side Public License (SSPL). This changed the conditions under which cloud providers, including AWS, could continue to capture value on the software as before. Accordingly, vendor-led changes are

not just project adjustments; they are strategic decisions by vendors to rebalance value capture between themselves and downstream users.⁶ Other cases that included vendor-led licensing changes as tied to value capture changes include:

- › **Elasticsearch and the OpenSearch Fork:** In February 2021, Elastic relicensed Elasticsearch and Kibana to the SSPL jointly with an Elastic license. This resulted in a decision at Amazon AWS to fork Elasticsearch and Kibana into

by over 100 companies and 1,000 individuals in an attempt to get Hashicorp to reverse the decision to relicense. The manifesto was not successful, and the OpenTofu fork was created as a Linux Foundation project that later became a Cloud Native Computing Foundation project in April 2025. While almost all of the Terraform contributors were Hashicorp employees, OpenTofu had over 30 people and more than 10 companies who contributed in the first year.⁷

Unilateral vendor decisions often feel like a rug pull, where the vendor has reneged on the promise of openness, leaving users and contributors to find other solutions.

new projects called OpenSearch and OpenSearch Dashboard so that they could give their cloud customers an alternative to Elasticsearch. Most of the contributors to Elasticsearch were Elastic employees, so the impact of the relicensing event and the resulting fork were mostly confined to the users of Elasticsearch who were suddenly put in the position of needing to decide whether to continue using the Elastic projects under a new license or switching to the fork.⁷ In August 2024, Elastic added the Affero General Public License to Elasticsearch and Kibana making them open source again, and in September 2024, OpenSearch became a Linux Foundation project.

- › **Terraform and the OpenTofu Fork:** Hashicorp relicensed several of their open source projects, including Terraform in August 2023 moving them under the Business Source License, which is not an OSI recognized open source license. A collection of users created a manifesto signed

- › **Redis and Valkey Fork:** Redis relicensed their open source project in March 2024 and put it under the Redis Source Available License and the SSPL, neither of which are OSI recognized open source licenses. Because Redis had a large number of contributors who were not employed by the vendor, the dynamics of this situation are quite different from the Elastic and Hashicorp examples with existing Redis maintainers and contributors driving the creation of the Valkey fork as a Linux Foundation project.⁷ In the first year of the fork, Valkey had over 50 contributors who are employed by over a dozen companies (including several large cloud providers) and over 20 of those contributors previously contributed to Redis.

From a restricted access perspective, value capture is often less direct than direct open source being provided as a cloud service, as in the MongoDB case. From a restricted access perspective, value capture is strengthened for the controlling vendor while

having less impact on cloud providers. The primary impact is felt by the users of the open source projects who relied on access to releases to capture value more indirectly by using them to deliver products and services to their customers. From a user perspective, open source software may be a component of a revenue generating product and/or as part of a solution to manage the infrastructure to build and deliver products and services to customers, so disruptions caused by unilateral, vendor-led changes, like restricting access to releases, can result in additional costs and effort for those users, which reduces their ability to capture value from those open source projects.

As an example of restricted access, Puppet^a is a popular open source configuration management tool that is now owned by the vendor Perforce and is used by a wide variety of organizations to automate infrastructure management. For the past 15 years, Puppet's business model has been an open core model with open source Puppet as the core for the proprietary licensed Puppet Enterprise along with offering paid support and services to their customers. As Puppet existed for over 20 years prior to the acquisition by Perforce, there is a vibrant open source ecosystem that built up around the open source version of Puppet. In this open source ecosystem, consulting organizations use Puppet to capture value for their clients by using Puppet as part of their service offerings. Open source Puppet has always created value capture tension because the open source offering of Puppet competes with the Puppet Enterprise commercial product from a user perspective and outside consulting organizations create offerings that compete with the official Puppet professional services, support, and education offerings.

While this value capture tension has always existed, the Perforce response has been part of the more recent trend

^a One of the authors of this article, Dawn Foster, was a Puppet employee from 2012–2015.

of vendors making unilateral decisions on behalf of open source projects. Perforce announced that they will be slowing the release frequency of source code contributions to the public repository, hence restricting access to the latest open source software. As such, the Apache2.0 licensed code of Puppet remains open source, but it remains several releases behind the End User License Agreement (EULA) licensed version offered by Perforce.⁸ While this was not a full relicensing event as was the case with MongoDB, the result was similar resulting in a fork in January 2025 of the Apache2.0 release of Puppet called OpenVox. With the creation of the fork, users and consultants can now choose between accepting the Perforce EULA and purchasing a support agreement if they are over the free threshold of 25 nodes or switching to the OpenVox fork. Other cases that included vendor-led release changes as tied to value capture concerns include:

- ▶ *Buoyant and Linkerd*: Linkerd is an open source CNCF project: however, all of the maintainers for Linkerd worked for the vendor Buoyant. In February 2024, Buoyant announced that they were putting the stable release images of Linkerd in the hands of the vendor community (that is, Buoyant). In this case, the project remained under an open source license, and the project continues to make source code releases, but the packaged images are only available to Buoyant's customers, restricting access to others. In October 2024, Buoyant announced that this change has been successful in allowing them to double their recurring revenue and become profitable, and they used some of that money to hire additional maintainers and support staff for the open source Linkerd project.
- ▶ *Broadcom and Bitnami*: For years, Bitnami images were the de facto method of running many of the

most popular apps on top of Kubernetes. Bitnami was acquired by VMware in 2019, and VMware was acquired by Broadcom in 2023. In August 2025, Broadcom announced that if companies and open source projects wanted to continue getting images with new versions and security updates, a Bitnami Secure Images subscription was required. The source code remains available under an Apache 2.0 license, but the container images are no longer freely available.⁹

IMPLICATIONS AND RECOMMENDATIONS

For organizations that use and contribute to open source projects

Choosing to use and contribute to open source projects without Contributor License Agreements (CLAs) can be a more viable, lower risk option where concerns of unilateral, vendor-led changes exist. CLAs often give vendors the ability to make unilateral decisions (for example, relicensing or restricted access) on behalf of an open source project and avoiding projects with CLAs may be prudent for some organizations.

Additionally, embracing projects under neutral foundations (for example, ASF, Eclipse, Linux Foundation) with leaders/maintainers who are employed by a variety of different organizations is another option for selecting projects that are likely to avoid unilateral, vendor-led decision making since foundation projects are less likely to experience disruptions from unilateral vendor decisions. However, as we demonstrated earlier in the Buoyant and Linkerd case, when the maintainers and contributors are all or mostly employed by a single vendor, that vendor can create disruptions even in foundation-brokered projects.

As users and value capturers of open source projects, organizations have the power and resources to avoid future challenges that may stem from

unilateral, vendor-led decisions. Diverse organizational involvement can positively impact the sustainability of both vendor and foundation-brokered open source projects, including any future forks. Having people affiliated with your organization working within projects of organizational interest helps to understand any vendor dynamics along with the strengths and weaknesses of that project while also influencing and stabilizing the project from within.

For vendors that own open source projects

Vendors should carefully weigh both positive and negative potential consequences before making unilateral decisions on behalf of an open source project. On the positive side, there could be financial benefits for the vendor. Negative consequences might include a fork that results in decreased downstream use, loss of contributors leading to reduced innovation, and negative press. It's up to each vendor to determine whether any additional financial benefits would outweigh the potential downsides.

Governance structures matter as much as licensing and release access in determining the long-term sustainability of open source projects. Vendor-owned projects can benefit from singular control, but at the same time, that control can create potential disruptions for users, contributors, and organizations that depend on the project outcomes. The cases show that software providers, such as cloud providers, and vendor-led firms can be in competing value-capture positions around the same open source software. Vendors seek to protect revenue associated with their open source project while cloud providers create value through scale, hosting, and integrations of that same software. As these tensions exist, projects may be reconfigured by vendors through license changes and release restrictions, impacting the value propositions for others who rely on the software.

For organizations that rely on open source, these changes by vendors highlight the importance of technical merit alongside governance risk. Dependence on projects with singular vendor control can expose downstream users to sudden disruptions in the access to and availability of the open source software. Vendors sometimes find themselves in difficult financial situations, and this issue alone should dictate a careful review of their controlled projects if they are intended to be used for reasons of long-term value capture by an organization. ■

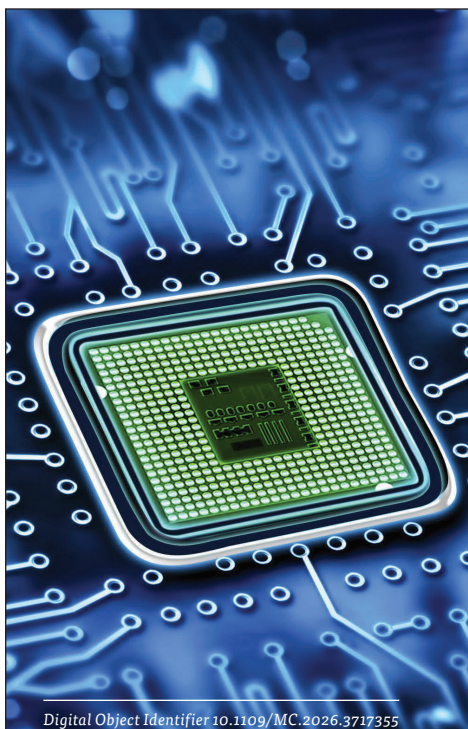
REFERENCES

1. L. Dahlander, "Appropriation and appropriability in open source software," *Int. J. Innov. Manage.*, vol. 09, no. 03, pp. 259–285, 2005, doi: [10.1142/S1363919605001265](https://doi.org/10.1142/S1363919605001265).
2. L. Morgan, J. Feller, and P. Finnegan, "Value creation and capture with open source software: A theoretical model for understanding the role of value networks," in *Proc. Eur. Conf. Inf. Syst. (ECIS)*, 2010, p. 150. [Online]. Available: <https://aisel.aisnet.org/ecis2010/150>
3. D. Riehle, "Single-vendor open source firms," *Computer*, vol. 53, no. 4, pp. 68–72, Apr. 2020, doi: [10.1109/MC.2020.2969672](https://doi.org/10.1109/MC.2020.2969672).
4. L. Morgan and P. Finnegan, "Beyond free software: An exploration of the business value of strategic open source," *J. Strategic Inf. Syst.*, vol. 23, no. 3, pp. 226–238, 2014, doi: [10.1016/j.jsis.2014.07.001](https://doi.org/10.1016/j.jsis.2014.07.001).
5. A. Fosfuri, M. S. Giarratana, and A. Luzzi, "The penguin has entered the building: The commercialization of open source software products," *Org. Sci.*, vol. 19, no. 2, pp. 292–305, 2008, doi: [10.1287/orsc.1070.0321](https://doi.org/10.1287/orsc.1070.0321).
6. K. Karhu, R. Gustafsson, and K. Lyytinen, "Exploiting and defending open digital platforms with boundary resources: Android's five platform forks," *Inf. Syst. Res.*, vol. 29, no. 2, pp. 479–497, 2018, doi: [10.1287/isre.2018.0786](https://doi.org/10.1287/isre.2018.0786).
7. D. Foster, "The new dynamics of open source: Relicensing, forks, and community impact," 2024, arXiv:2411.04739.
8. T. Shahaf and D. Sandilands, "Our plans for open source puppet in 2025," *Puppet Blog*, Nov. 7, 2024. [Online]. Available: <https://www.puppet.com/blog/open-source-puppet-updates-2025>
9. J. Jackson, "Broadcom ends free Bitnami images, forcing users to find alternatives," *The New Stack*, Sep. 30, 2025. [Online]. Available: <https://thenewstack.io/broadcom-ends-free-bitnami-images-forcing-users-to-find-alternatives/>

DAWN FOSTER is an open source strategy consultant in London, UK. Contact this author at dawn@dawnfoster.com.

MATT GERMONPREZ is the Mutual of Omaha Distinguished Chair of Information Science and Technology

and a professor of information systems and quantitative analysis in the College of Information Science and Technology, University of Nebraska Omaha, Omaha, NE 68182 USA. Contact this author at germonprez@gmail.com.



Digital Object Identifier 10.1109/MC.2026.3717355

IEEE TRANSACTIONS ON

COMPUTERS

Call for Papers

Publish your work in the IEEE Computer Society's flagship journal, *IEEE Transactions on Computers*. The journal seeks papers on everything from computer architecture and software systems to machine learning and quantum computing.



Learn about calls for papers and submission details at www.computer.org/tc

