

## WHITE PAPER

# 2021 Open Source Trend Report

Operating Systems and Data / Cloud Technologies

## Executive Summary

Behind every modern system design trend, there is good open source software.

Microservices? The accessibility of Docker and Kubernetes led to a boom in container-based applications and systems. Service mesh? Open source projects like Istio have been pioneers. Big data? Open source projects like Cassandra, Kafka, Camel, and Spark are empowering organizations to put their data to work at scale.

In this report, we look at the top open source technologies behind the biggest trends in modern system design and development – as told by two surveys. The first, an internal survey of our Enterprise Architects, and the second, a public survey of development professionals.

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## Measuring the Trajectory of Open Source Operating Systems, Data Technologies, and Cloud Technologies

As a company that supports over 400 open source packages, our team at OpenLogic has a vested interest in staying current with the latest open source trends and technologies.

One underlying aspect of our support is in understanding the long-term trajectory of open source projects and ensuring that the technologies companies integrate today will be able to support innovation tomorrow.

With that in mind, we surveyed our team of Enterprise Architects in hopes of sharing our thoughts on fringe and established open source technologies, and our views on their short and long-term trajectories.

The graphics featured in subsequent sections are based on the results of that survey, which focused on three key areas of open source: Data Technologies, Operating Systems, and Cloud Technologies.

For Cloud and Data Technologies, we asked the team to rate each listed technology on a scale of one to five, based on two areas:

1. Where the technology fits on a maturity scale of “Bleeding Edge” to “Mature”.
2. The relative importance of the technology to modern development.

For operating systems, we altered the prompts to be more tied to adoption rather than maturity, instead asking for each team member to rate each listed OS on a scale of one to five based on these criteria:

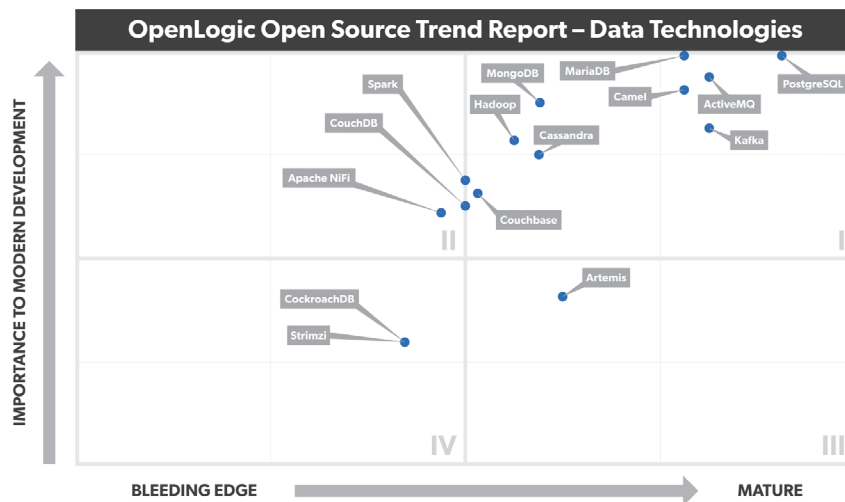
1. Whether the operating system is experiencing a drop in adoption, or increase in adoption.
2. The relative importance of the operating system to modern development.

Obviously, both sets of questions are highly subjective — but our goal was to use the responses to establish commonalities in opinion. The survey results below represent our team’s collective perception of which technologies are up and coming, which ones are at their peak, and which ones are on their way out of the spotlight.

In the next sections of the paper, we dive in on the results of the internal survey, and share opinions from our talented team of Enterprise Architects. At the end of the paper, we present the results of our public survey – which asked respondents to weigh in on the frontrunner to “replace” CentOS, their experience with service mesh technologies, and their current development priorities.

## DATA TECHNOLOGIES

The first focus area for our internal survey was related to data technologies. We asked our team of enterprise architects to rate each technology listed here on a scale of one to five, with one representing bleeding edge innovation, and five representing a fully matured technology. Second, we asked them to rate each technology's importance to modern development. As discussed previously, these ratings are highly subjective. However, the commonalities in opinion provide a fair assessment of the trajectory for these technologies.



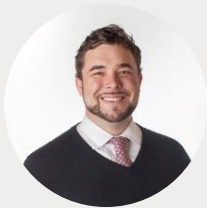
The results of our survey found Camel, Kafka, PostgreSQL, MariaDB sitting squarely in quadrant one, with our experts giving a high rating to their maturity and relative importance.

Cassandra, Hadoop, MongoDB, Couchbase, Spark, and CouchDB also fell in quadrant one, marking a general agreement that the technologies were important to modern development, but potentially less mature than the previously mentioned technologies.

Sitting in quadrant two, our team found Apache NiFi to be moderately important, but less adopted than other data technologies.

Apache Artemis was the sole technology in quadrant three, pointing to it being above average in maturity, but not a necessity in developing modern systems.

Lastly, CockroachDB and Strimzi were rated as more innovative, but less important to modern system design.



### Connor Penhale

ENTERPRISE ARCHITECT AT  
OPENLOGIC

*"The thoughts around maturity are changing. There are data technologies, like Strimzi, that don't even have a major version number yet – but are in production at large, enterprise companies. For those who have the in-house expertise and developer hours to support these cutting edge data technologies early on in their lifecycle, they can leverage the benefits of these packages before many other organizations."*

*For these companies, ensuring their teams are trained and enabled to self-support these packages is critical.*

*Another thing that stood out in the results, and it echoes something I'm hearing from customers, is that there's a lot of interest in the technologies that support and utilize data at scale right now. I would expect technologies like CockroachDB, Couchbase, Cassandra, Spark, Kafka to increase adoption in months and years to come.*

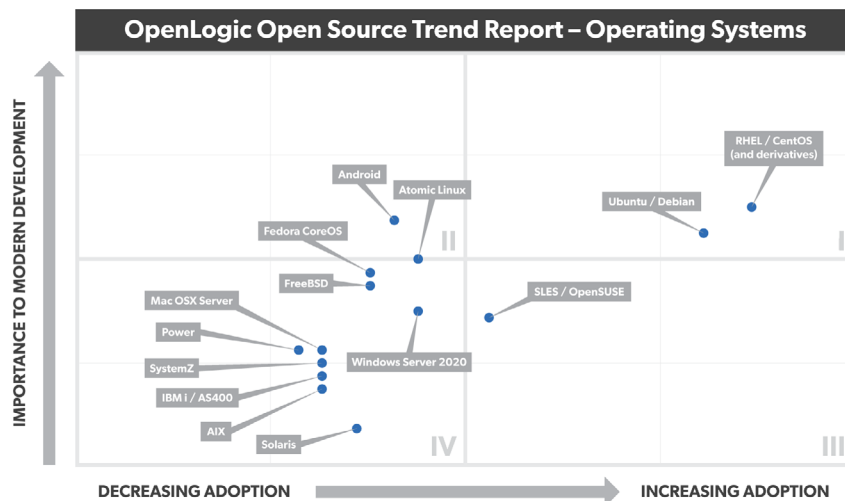
*ActiveMQ is another interesting technology here. Many companies are using ActiveMQ as a way for legacy systems to embrace DevOps, but it may become less necessary as companies modernize their underlying infrastructure."*

## OPERATING SYSTEMS

In our next focus area, we asked our Enterprise Architects to share their opinions on operating systems.

Specifically, we asked our team to rate the following operating systems on a scale of decreasing to increasing adoption, and the perceived importance of that operating system to modern development.

Our results were divisive, with many of the listed operating systems sitting squarely in quadrant four. This indicates both a perception of declining adoption, and a lack of importance to modern development.



Android was the sole representatives for quadrant two, indicating a perceived increase in adoption, but a lack of importance to modern development.

Atomic Linux was rated at just below average for adoption, but squarely average for overall importance. SLES / OpenSUSE were rated in quadrant three, representing their importance to modern development, but experiencing a perceived decrease in adoption.

RHEL / CentOS and derivatives were rated highest in our internal survey, with a perception of being important to modern system development, and experiencing increasing adoption.

Ubuntu / Debian were also listed in quadrant one, just behind RHEL / CentOS in terms of relative importance and increasing adoption.



**Vince Cox**

**ENTERPRISE ARCHITECT AT  
OPENLOGIC**

*"Looking at some of the top rated responses, RHEL/CentOS, Ubuntu/Debian, and SLES/OpenSUSE could essentially be interchangeable depending on which flavor someone wants. From a capability standpoint, each could serve as a valid choice with little to no drop off.*

*Many of the operating systems listed here are important to system design, depending on what you're designing.*

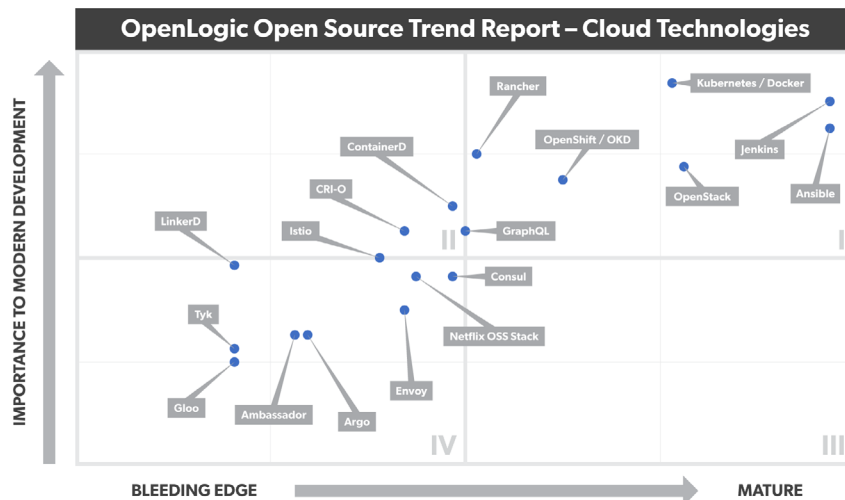
*For example, those highly dynamic OS situations with lots of moving parts are not a good fit for Atomic Linux. But that's not to say it doesn't have good use cases, and it's certainly not to say it doesn't have the potential to grow in adoption as it becomes useful for a wider audience. That example can be applied to many of the operating systems.*

*From a landscape perspective, I expect to see many of these operating systems hold the same relative market share for the same reasons they hold it today – many of them remain directly married to the underlying hardware. Until a product comes in and disrupts that reality, it will remain relatively unchanged."*

## CLOUD TECHNOLOGIES

The push to cloud is fueled by open source technologies, and our Enterprise Architects had a lot of opinions on which technologies to include on this list. In the end, we asked them to share their ratings on a range of technologies that best encapsulated the cloud development ecosystem.

To rate the technologies, we asked our team to give their opinions on the maturity of the technology, and its overall importance in modern development.



What each architect considered “important to modern development” varied, as did their assessment of maturity. However, we did see a number of commonalities.

Kubernetes, Docker, Jenkins, and Ansible were almost universally agreed upon as mature and important to modern development. While service mesh technologies like Istio, Linkerd, and ContainerD were shown as more important to modern development, but less mature.

Other technologies, like Tyk, Gloo, and Ambassador were seen as relatively unimportant and less mature.



**Joe Carder**

**ENTERPRISE ARCHITECT AT  
OPENLOGIC**

“Our internal survey showed fairly expected results, with Jenkins, Ansible, Docker, OpenStack, and Kubernetes as well-adopted technologies. The results for Istio, Envoy, ContainerD all point to their role in making services meshes increasingly accessible and practical.

The results also pointed to a changing of the guard -- with OpenShift and OpenStack being marked as less essential than many of the listed technologies. Those results point to the maturity of container technologies, and the ability to move from monolithic systems to microservices without the

intermediary step represented by something like OpenStack, or a tightly coupled single vendor tie-in solution like OpenShift.

Other technologies, like Jenkins and Ansible, were still viewed as very important to modern system design. With many companies still working toward CI/CD, it makes sense to see them ranked highly.

Our team viewed technologies like Istio, Envoy, and ContainerD as a moderately important factor in system design, pointing to both the maturation and scaling of microservices systems, and the growing maturity and accessibility of these technologies.

These results also speak to a larger trend: technologies that give organizations the agility needed to change providers, move to cloud, cloud-hybrid, or stay on premises, and to work with a variety of substrates are going to become more and more popular.”



## Public Survey Results

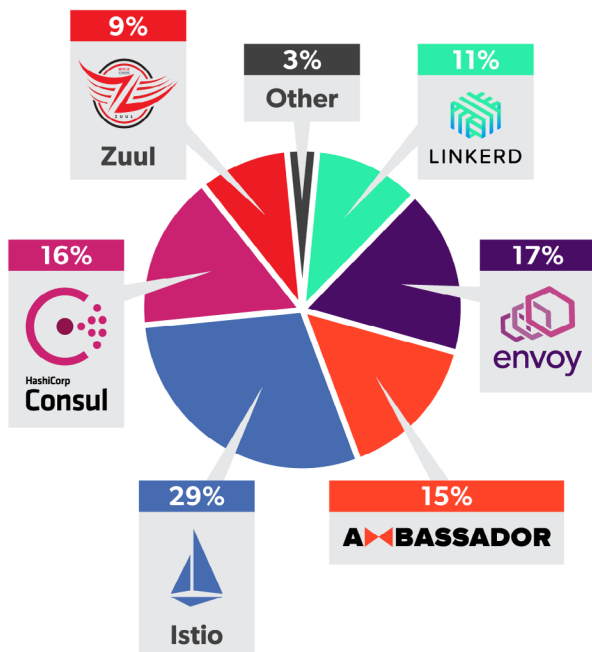
While our team of Enterprise Architects gives fantastic insight into open source trends, trends are much more of a public phenomenon. With that in mind, we asked software development professionals to weigh in with their answers to three questions centered around service mesh technologies, CentOS alternatives, and current development priorities.

The surveys were administered to 150 respondents from January 15 to March 30th via social media and email.

### TOP SERVICE MESH TECHNOLOGIES

In our first question, we asked respondents to weigh in on their experiences with popular service mesh technologies.

#### "WHICH OF THE FOLLOWING SERVICE MESH TECHNOLOGIES HAVE YOU EXPLORED OR IMPLEMENTED?"



For respondents who had explored or implemented service meshes, 29% reported using Istio. A 17% reported using Envoy, with Consul and Ambassador trailing in popularity at 16% and 15%, respectively. Linkerd reported in with 11% of respondents, with Zuul rounding out the list at 9%. An additional 3% of respondents reported using another service mesh technology.



### Justin Reock

**CHIEF EVANGELIST,  
OSS AND API MANAGEMENT  
AT PERFORCE SOFTWARE**

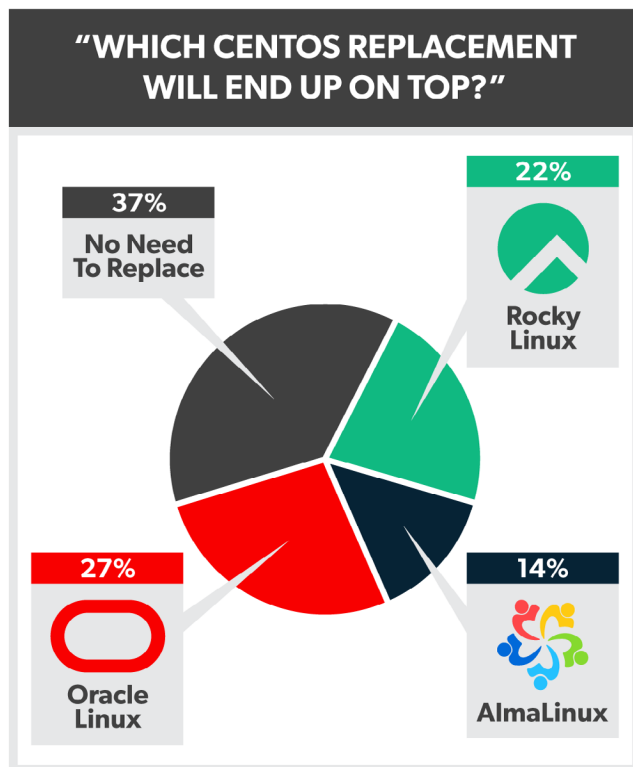
*"The service mesh pattern is exploding, due in large part to a combination of marketing dollars spent by technology stakeholders such as Google, and the genuine usefulness of the pattern. Service meshes allow businesses to separate network traffic concerns from application and data concerns, unlocking things like easy canary deployments and QoS enforcement.*

*Istio is an early solution that has gained a lot of momentum, but, next generation solutions like Linkerd are quickly finding their footing and seeing a lot of support from organizations like the Cloud Native Computing Foundation. Analyst reports are tilting that way as well, with Linkerd and Envoy generally scoring higher in terms of overall usability.*

*This pattern is proving to be the next deployment standard, in line after the SOA and API to API innovations of the past few decades."*

## CENTOS ALTERNATIVES

In our first survey question, we asked respondents to weigh in on a hot topic in Linux – CentOS alternatives. While there are other hopefuls out there, we limited responses to the generally accepted frontrunners, AlmaLinux, Oracle Linux, and Rocky Linux. We also provided an option to respond that there's no need to replace.



Our survey found that 37% believe there is currently no need to replace CentOS. Oracle Linux was another popular choice, with 27% of respondents picking it as the frontrunner to replace CentOS. Rocky Linux and AlmaLinux rounded out the list at 22% and 14%, respectively.

### Justin Reock

*"This data is telling a few stories at once. As OpenLogic has maintained, there are benefits to businesses who are capable of fully automated CI/CD in taking CentOS Stream, such as near effortless security patching of systems. That said, the majority of enterprises do not appear ready to fully embrace a rolling release of an operating system and have expressed concern about the CentOS communities decision to effectively EOL CentOS 8 at the end of 2021 in favor of CentOS Stream. So, it is surprising to see that a large number of respondents indicated that they didn't see a need to switch. This could mean a few things:*

- *Not all businesses are aware of the announcement from CentOS*
- *Not all businesses understand the potential impact of switching to a rolling release*
- *On a more positive note, it could mean that more businesses than expected are in fact capable and ready for a rolling release of CentOS*

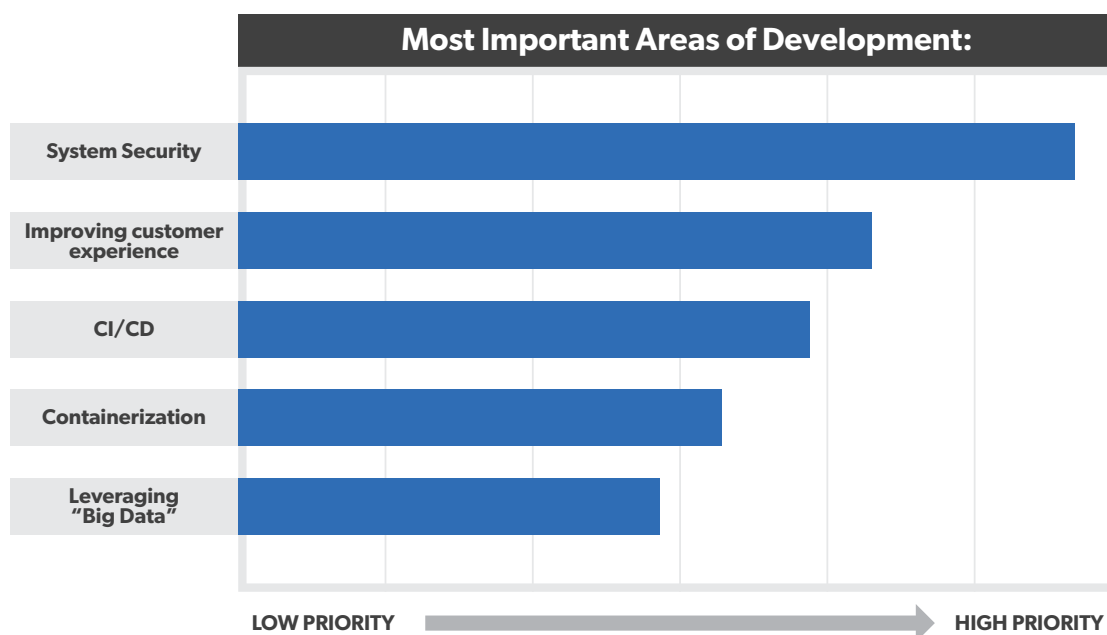
*The Oracle numbers also suggest what we know – that until Alma and Rocky Linux are released and relatively proven in the marketplace, trust will still go to the organization who has successfully been building against RHEL 8 the longest and in the most freely redistributable capacity, and that (in lieu of CentOS 8) is currently Oracle."*



## DEVELOPMENT PRIORITIES

In our third and final question, we asked respondents to share their current development focuses by rating our list of trends from highest to lowest priority.

Our survey found system security as the highest rated development focus, followed by improvements to customer experience in second. Modernization trends trailed these options, with CI/CD, Containerization, and Leveraging “Big Data” in the third, fourth, and fifth spots.



### Justin Reock

*“These results indicate some of the shifts in focus that the market has experienced, notably with Security concerns (which arguably impact the second priority, customer focus) listed as the most important area of development for the business, to a degree well outside the margin of error. A series of high profile hacks as well as the accelerated pace of digital transformation has made securing our digital assets every bit as important as our physical assets – in some cases, even more so.*

*That increase in pace has also created a need to keep up with expected customer experiences such as online ordering and*

*pickup, or even fully digital experiences, and I think that’s where you see the desire to improve customer experience tracking right after it.*

*Fully automated CI/CD unlocks rapid development for companies, which allows them to get their products out the door and generating money for the business faster. I expect this to continue even further as we look at the coming year, and as businesses grow in these practices, their need to deploy in containers, and finally to leverage their company’s data to create predictive business models will continue to grow.”*

## Final Thoughts

As the world becomes more and more driven by software, with IDC now famously reporting that roughly 2/3 of the entire global GDP will be based in digital assets by as early as 2022, our needs and expectations around software continually change. These trade winds can be disrupted even further by unexpected community announcements, like the changes regarding CentOS Stream.

Open software is mercurial by design, and can easily adapt to these changing needs, so we hope that this report has helped elucidate some of those directions. By remaining aware of broader patterns in the marketplace your business can ensure accurate selection of technologies and patterns as you move into the year.

## Get Support for Your Open Source

Whether you are living on the bleeding edge of innovation, or you are joining the party with established open source packages, our team of experienced Enterprise Architects can help make your mission a success. Talk with an expert today to see how OpenLogic can help support your open source goals.

**TALK TO AN EXPERT**

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