

# Driving DevOps Automation

Using Automation to Deliver Cloud Migration and Market Readiness with Speed and Efficiency



**Pathfinder**

May 2021

Commissioned by



**Red Hat**

451 Research

**S&P Global**

Market Intelligence

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# About the Author



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Jay Lyman is a Senior Research Analyst with the Cloud Native and Applied Infrastructure & DevOps Channels at 451 Research, a part of S&P Global Market Intelligence. He covers infrastructure software, primarily private cloud platforms, cloud management and enterprise use cases that center on orchestration, the confluence of software development and IT operations known as DevOps, Docker and containers. Jay's analysis encompasses evolving IT operations and software release models, as well as the technology used to create, deploy and support infrastructure and applications in today's enterprise and service-provider markets. Key areas of research also include OpenStack, PaaS and enterprise end users.

Prior to joining 451 Research, Jay worked as a journalist for various media firms and publications including CMP Media, LinuxInsider, NewsForge, Time Magazine and the Associated Press.

As a 451 Research analyst, Jay has been a speaker at numerous industry events, including IC3, DevOps Days, LinuxCon and OSCON, covering topics such as cloud computing, DevOps, open source software and enterprise case studies.

# Executive Summary

Automation is critical to successful and effective implementation of DevOps, which is a collaboration among developers and IT operators for faster releases and more efficient IT management. Automation and DevOps are essential parts of IT transformation, which includes modernization of infrastructure, applications and cloud migration, as well as cultural transformation.

Recent market disruptions have illustrated the need for organizational agility and have served as a gut check on the progress of these transformations. Many of those already on their journey have sped up actions to take advantage of changes in the market. Companies that have yet to make these changes are often the organizations that cannot keep pace and remain competitive.

Speed and efficiency have typically been touted as the advantages of DevOps, but flexibility to respond to change has emerged as the primary benefit. Readiness has always been an important aspect of DevOps, with organizational agility emerging as critical, whether it's centered on implementing new technology such as cloud native, addressing security breaches and incidents, or responding to impacts from global events. DevOps is as much about culture as it is about technology. Even though a growing number of enterprises are recognizing the importance of addressing cultural challenges, friction and silos persist.

Open source is a key component of automation, DevOps and cloud-native approaches. Open source is typically a popular choice in difficult economic times; however, enterprises that focus more on paid, commercial open source automation do so to gain essential benefits such as enterprise-grade assurances, certifications, security and support, which they can only get from a vendor. They expect the code to be open source, but they also demand these key assurances and related services to help manage risk and ensure resilience.

As the key findings below suggest, business is playing a larger role in DevOps as it matures. Additional stakeholders, including management leadership and line-of-business professionals, are being pulled into the process, and enterprises are using both business and technical indicators to measure their DevOps success. This is driving a role for line-of-business and product managers to work with data-driven DevOps professionals to set business objectives and assess outcomes.

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## Key Findings

- **Automation is expanding in the enterprise – our Voice of the Enterprise: DevOps research found that the use of ‘mostly automated with some manual processes’ grew from 30% to 36% in one year.** Organizations are moving away from manual tasks that drag down developer and IT operational efficiency and preclude a focus on new products, features and innovation.
- **Recent market disruption has been a driver of DevOps, with more companies accelerating (31%) or starting initiatives (13%), compared to those delaying (17%) and canceling initiatives (3%) because of the pandemic.** Sudden market changes such as this illustrate the real need for transformation toward DevOps and automation because of organizational agility benefits.
- **Top DevOps cultural challenges are overcoming resistance to change (35%), promoting communication among teams not accustomed to it (34%), and breaking down silos for collaboration (33%).** IT leaders that have already begun their journey toward DevOps and automation are more likely to consider a broader range of cultural factors.
- **Enterprises are heavily reliant on open source software, though they typically require paid, commercial support for certification, security and other benefits.** More than a quarter (**26%**) of organizations indicated they had accelerated use of paid, commercial open source in response to recent market disruption, compared to 21% that accelerated use of free, community open source.
- **Business initiatives and teams are playing an increasingly prominent role in enterprise DevOps.** Companies are measuring DevOps success using not only technical metrics such as quality (56%) and application performance (50%), but also business metrics such as customer satisfaction (47%).

# Automation Drives DevOps, Digital Transformation

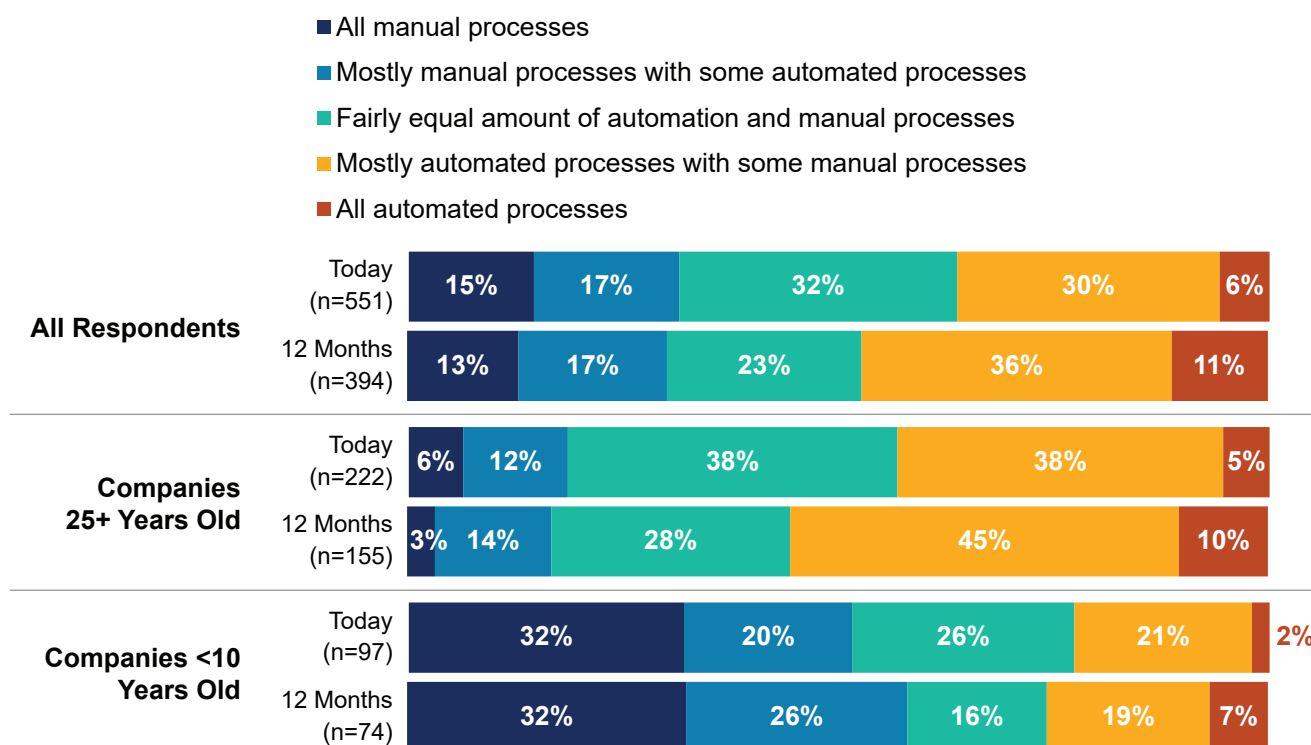
Automation is a central component of enterprise DevOps because it expedites collaboration among software development and IT operations teams and often results in faster releases and more efficient IT management. By replacing manual and repetitive tasks – such as creating new users, copying files and starting services with automation, teams and organizations are able to drive greater development velocity while managing larger-scale infrastructures with smaller teams. The larger benefit may be the work that teams are freed to focus on: new applications, new features, more innovation and addressing user feedback. While automated processes can serve as the basis for successfully using DevOps to drive more innovation and transformation, most organizations are still on a journey toward automation, with some processes still mostly manual.

However, enterprises are clearly pursuing a reduction of manual processes, and ultimately, end-to-end automation for DevOps and other needs. When we asked survey respondents about their top priorities as their organizations refine, improve and expand their DevOps deployments, we found that end-to-end automation is among them. Our survey also found that organizations expect to replace a growing number of manual processes with automated ones over the next year (see Figure 1). Automation is clearly expanding. While the move to automation can be a slow work in progress, our study does show the most dramatic growth for ‘mostly’ and ‘all’ automated processes, which is expected to climb from a combined 36% today to 47% a year from now.

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**Figure 1: Growth of Automation for Established and Newer Companies**



Q: Which of the following best describes the level of IT automation in your organization? What do you expect it to be in 12 months?

Base: All respondents (n=551)

Source: 451 Research's Voice of the Enterprise: DevOps, Organizational Dynamics 2020

Despite the perception that newer, younger companies are more progressive in implementing automation, respondents whose companies are older (25 years or more) reported fewer manual processes and higher levels of automation compared to their younger counterparts (younger than 10 years). This is a reminder that older, more established organizations – which typically have larger volumes of processes and resources – are not always at a disadvantage when it comes to this type of transformation.

DevOps has also always been about leveraging the latest and greatest technology. When DevOps began more than 10 years ago, it was primarily focused on cloud computing. While leveraging cloud infrastructures – both public and private – is still a big part of DevOps, today's teams are focused on using cloud-native technology and newer methodologies such as containers, microservices, Kubernetes and serverless architectures. Cloud native is typically an enabler of DevOps teams and objectives. Container applications and infrastructure are more lightweight, portable and short-lived, making them easier to rapidly spin up or tear down as needed. However, cloud native also presents a greater degree of complexity. DevOps automation for cloud native is an area where automation can help drive simplicity and consistency for organizations managing containers and clusters, as well as hybrid and multicloud infrastructures.

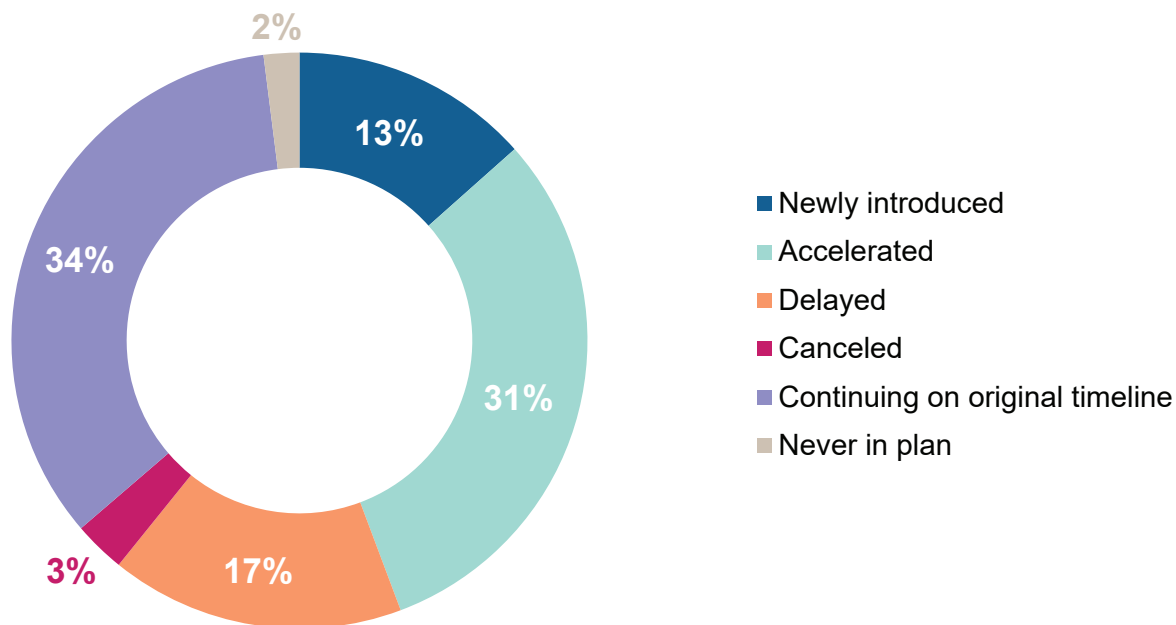
Automation can help organizations reduce errors and noise so that DevOps teams can manage software development and IT operations more efficiently and effectively. Other advantages of leveraging automation and reducing manual tasks include improved collaboration and communication and supporting feedback loops that help identify and eliminate bottlenecks.

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# Impact and Lessons from Market Disruption

We have seen how rapid market shifts have driven enterprise adoption of DevOps by highlighting the need for organizational agility, which depends on DevOps tenets such as automation and feedback loops. In our research, more organizations indicated they are accelerating (31%) or introducing (13%) DevOps initiatives compared to those reporting delays (17%) or cancellations (3%) as a result of COVID-19 (see Figure 2).

**Figure 2: Disruption Drives DevOps Adoption**



Q: Some organizations have seen IT initiatives accelerated or delayed as a result of the coronavirus (COVID-19) outbreak. How have your DevOps initiatives been affected by the outbreak, if at all?

Base: All Respondents (n=551)

Source: 451 Research's Voice of the Enterprise: DevOps, Organizational Dynamics 2020

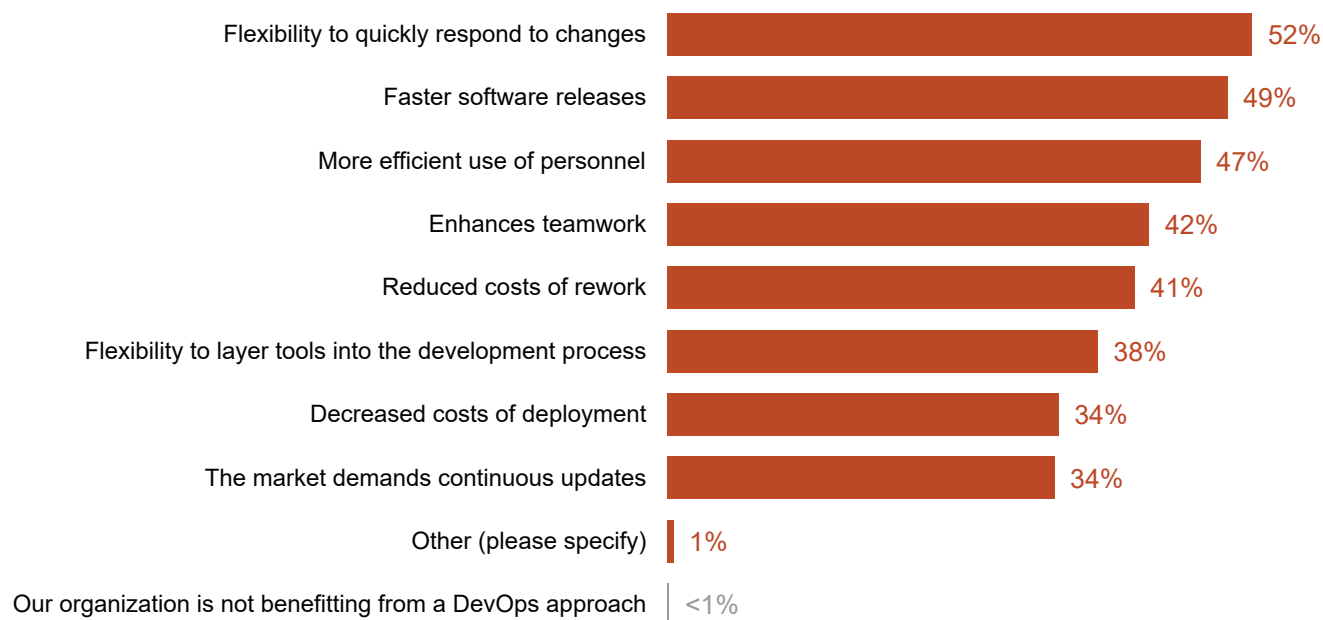
The importance of being ready to respond to the latest changes, not only in the market, but in the broader world, has never been clearer than amid the recent market disruption. We expect that moving forward, this readiness for any variety of changes in the landscape will become an even greater driver and benefit of using DevOps teams that are agile and can adapt, plan, rework and respond to the opportunities that come alongside the challenges.

Even before the recent market disruption, DevOps, software development and IT operations teams were often working in distributed scenarios. The support models for these teams – both technical and organizational – are serving as blueprints for companies that must now support remote teams on a broader scale. Our research indicates that many of the changes from the pandemic, particularly work-from-home and distributed teams, will persist beyond the event as individuals and organizations resolve the challenges and see the benefits.



While faster releases and more efficient IT operations are important, responsiveness and agility have always been a core component of DevOps. We see this desire for readiness prominently in our survey (See Figure 3), which indicates the biggest benefit of DevOps is flexibility to quickly respond to changes (52%), followed by faster software releases (49%) and more efficient use of personnel (47%). This responsiveness and agility aspect of DevOps – where automation is a key component – has been pushed to the forefront as organizations increasingly realize the need to be able to adjust quickly to disruption, whether it centers on technology developments, security incidents or global events.

Figure 3: Flexibility to Respond to Changes Is Top DevOps Benefit



Q: How is a DevOps approach benefiting your organization? Please select all that apply.

Base: All respondents (n=551)

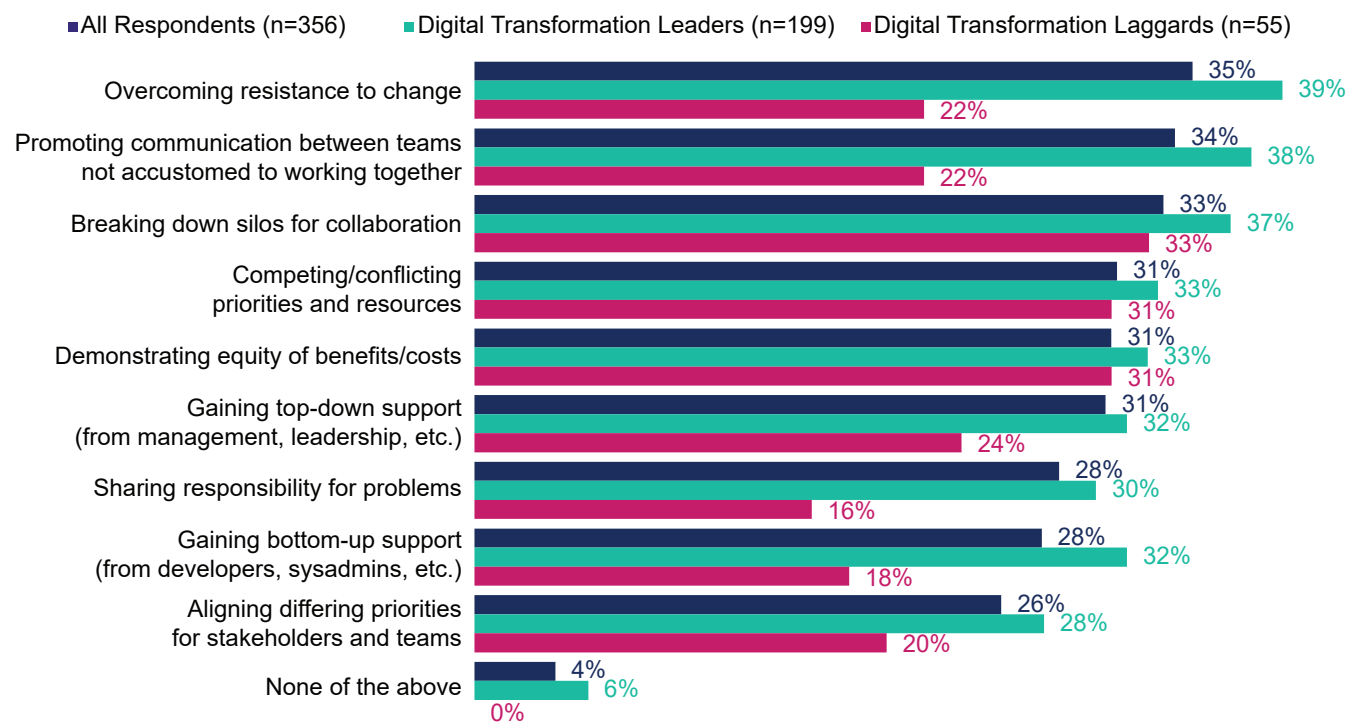
Source: 451 Research's Voice of the Enterprise: DevOps, Organizational Dynamics 2020



# Cultural Challenges and Synergies

As much as DevOps is about technology and methodology, it is also about culture. The whole point is to merge teams that have previously been siloed and are not aligned in terms of priorities, objectives and incentives. There is growing awareness of these cultural issues. When surveyed, respondents identified the top cultural challenges of DevOps (see Figure 4) as: overcoming resistance to change (35%), promoting communication between teams not accustomed to working together (34%) and breaking down silos (33%).

**Figure 4: Biggest Cultural Challenges of DevOps**



Q: What cultural changes, of any, are or were confronting your DevOps team? Please select all that apply.

Base: All respondents, abbreviated fielding (n=356)

Source: 451 Research's Voice of the Enterprise: DevOps, Organizational Dynamics 2020

Our research also shows that progressive IT leaders that have begun executing their digital transformation strategy are more likely to consider a broader range of cultural issues, indicating a maturity in their DevOps deployments. While enterprises have broken down many of the barriers between different teams, particularly development and IT operations, silos still persist. For example, when polled on who is in charge of DevSecOps requirements, nearly a third of organizations reported that DevOps and security teams work on requirements independently.

Automation can help bring together different IT teams by codifying collaboration and communication, thus bridging silos. Communities of practice – teams within organizations that have a common technical or business interest – can help overcome resistance to change and other cultural issues, as well as promote sharing of trusted automation content that helps reduce finger-pointing and drives more success.

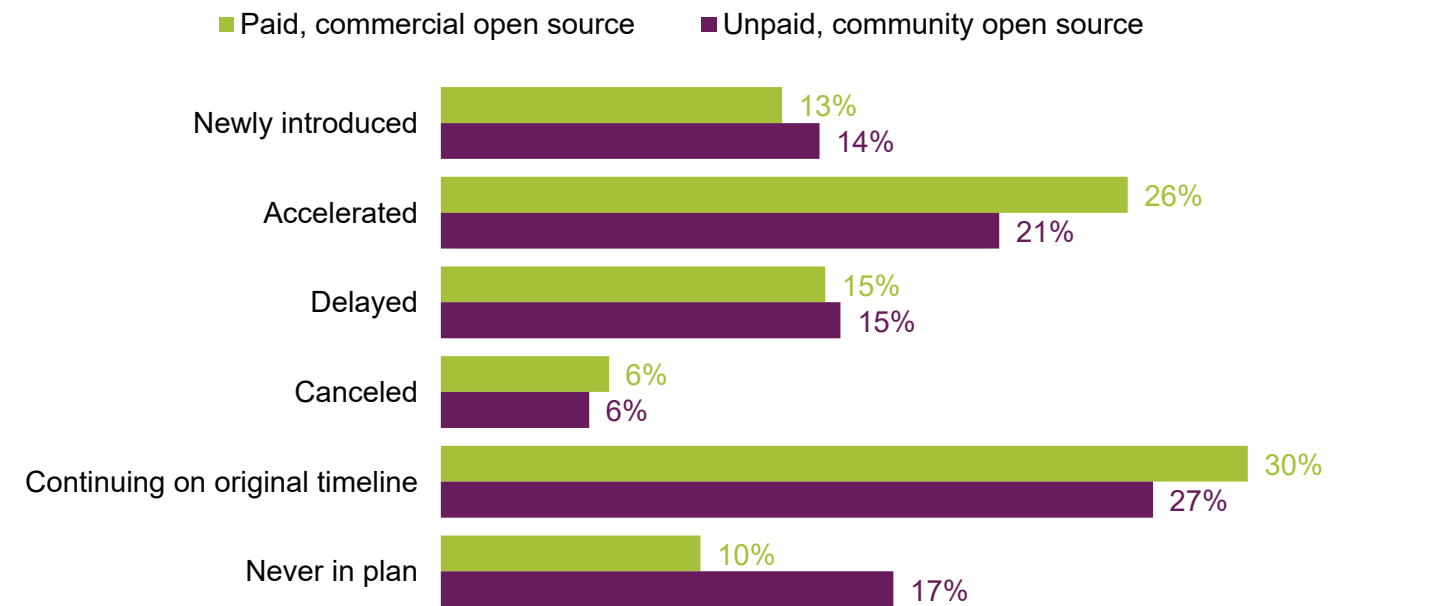
There are also new roles emerging in the industry, such as automation architects, who can work with software development, cloud and other practitioners across DevOps workflows to move beyond ‘single task’ automation to more comprehensive automation across processes such as application deployment to production. These new roles can also help foster cultural change by creating and stewarding communities of practice and working with a variety of stakeholders.

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# The Need for Paid, Commercial Open Source

Because of advantages such as modularity, flexibility, scalability and a broader development community, open source software is a critical component of cloud computing, enterprise DevOps and overall transformation. Although organizations have historically leveraged open source during difficult economic times to save on costs, our research shows that paid open source was driven more by the pandemic than free, community open source (see Figure 5).

Figure 5: Paid Open Source Driven More by Market Disruption



Q: Some organizations have seen IT initiatives accelerated or delayed as a result of the coronavirus (COVID-19) outbreak. For each of the following types of technology or initiatives at your organization, please indicate how they were affected by the outbreak, if at all.

Base: All respondents (n=551)

Source: 451 Research's Voice of the Enterprise: DevOps, Organizational Dynamics 2020

This highlights how organizations expect software to be open source, but they also require it to meet their standards in terms of certification, support and other areas. They often require that paid, commercial open source be backed by vendor certification and support. It is also indicative of open source advantages beyond cost savings, including a broader developer community, access to source code, and the ability to customize and avoid vendor lock-in.

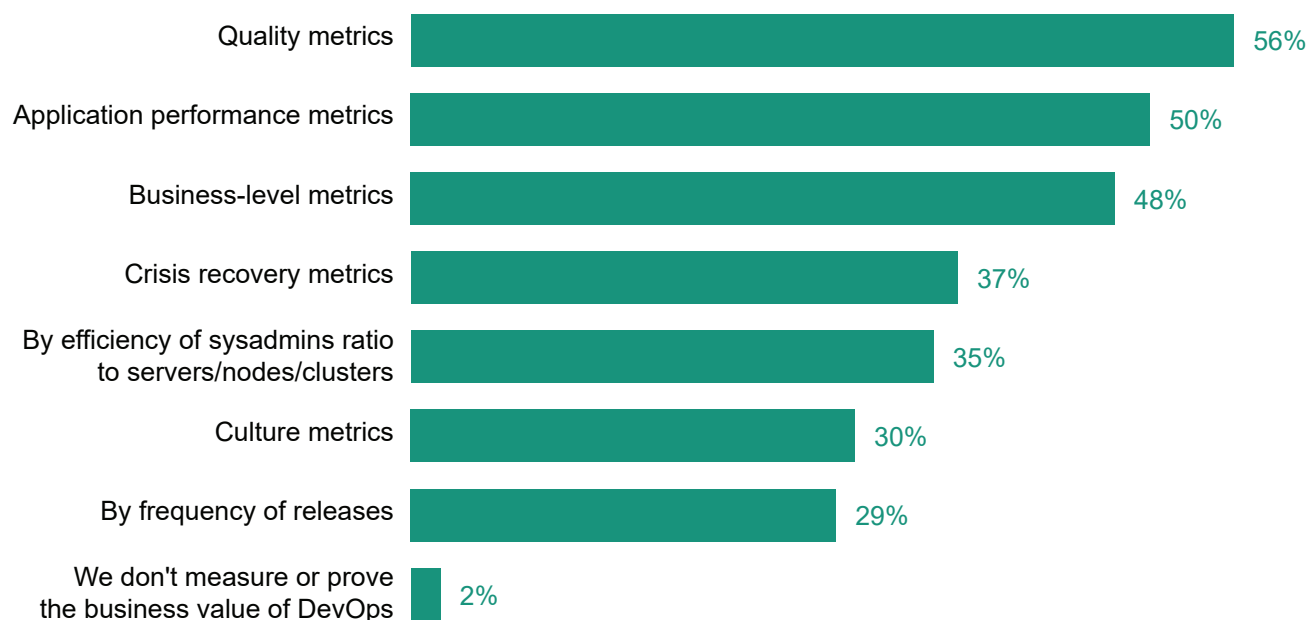
The reason customers require paid open source is the support and assurance it provides. For example, with greater levels of automation come interactions with key systems and services. Organizations need support, certification, and the ability to manage and control an expanding portfolio of projects that are based on open source automation software.

## A Bigger Role for Business

Business stakeholders and considerations are playing a greater role in DevOps as the trend matures and transitions beyond a grassroots movement to become a top-down initiative. Our research indicates that top stakeholders in DevOps, beyond developers and IT operations, include management leadership and line-of-business professionals. It's important that while DevOps should be focused mostly on the needs of developers and IT operations teams, there are both technologies and organizational approaches that support other stakeholders, including traditional IT administrators, security teams and data analytics/data science teams. Business users benefit and can get involved when tools do not require them to be experts in software development or IT operations.

Our research shows that enterprises are measuring and proving their DevOps success by not only technical metrics (see Figure 6) such as quality (56%) and application performance (50%), but also business metrics such as customer satisfaction (48%).

**Figure 6: Measuring and Proving DevOps Success**



Q: How do you measure/prove the business value of DevOps implementations? Please select all that apply.

Base: All respondents (n=547)

Source: 451 Research's Voice of the Enterprise: DevOps, Organizational Dynamics 2020

As DevOps deployments evolve, another top priority becomes end-to-end automation. We also note the typical pattern of DevOps adoption, whereby smaller implementations are used to illustrate the benefits first, then implementations spread to more applications and teams.

As DevOps expands, organizations must also consider the maturity of automation, which typically starts with automating single tasks and then expands to include automation of more domains and processes. This also means moving beyond automating configuration and provisioning to support broader automation via templated and curated components and stacks. In addition to supporting self-service for developers, DevOps and other teams, advanced automation can be key to proving technical and business benefits.

There are a growing number of organizations that are changing their view of automation, DevOps and infrastructure management amid overall transformation. Rather than viewing their software development and IT management as budget items or cost-loss centers, enterprises are increasingly considering the costs of not investing in transformation and organizational agility. In other words, companies are thinking in terms of return on investment rather than total cost of ownership.

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## Use Cases

DevOps and automation are critical to several key use cases in the enterprise:

- **Infrastructure:** Organizations are focused on moving beyond tactical management of IT to more strategic operations. This means supporting continuous integration/continuous delivery, auto-scaling workloads and leveraging new models, such as serverless architectures.
- **Networking:** Traditional IT management tasks and teams can be a point of friction for expanded DevOps and automation. Thus, companies must be able to orchestrate network provisioning, security, vulnerability remediation and enforcement of reporting and compliance mandates.
- **Cloud:** DevOps environments are growing as more applications move to the cloud. To effectively leverage cloud computing resources, organizations must be able to automate configuration and support application lifecycle management and self-service for developers and DevOps teams.
- **Security:** The DevSecOps trend means a growing number of DevOps releases include security elements. However, there are still silos and other challenges. This is where the use of predictive analytics and artificial intelligence can help organizations, even as they deal with the massive amount of devices and data in IoT/edge deployments. Automation can play well here to ensure that results of analytics, such as required maintenance updates, are implemented on a large number of devices.

# Conclusions

In order to achieve their DevOps and IT transformation goals, organizations must rely on automation, starting with manual, repetitive point tasks and working their way to more comprehensive process automation. Today's enterprise providers must leverage automation and abstraction to create invisible infrastructure that doesn't get in the way of DevOps teams focusing on speed and efficiency, as well as new applications, features, products and innovations.

Looking ahead, we expect to see more of DevOps and automation working together, spanning a variety of infrastructures and initiatives. As more workloads move to the cloud, on-premises infrastructure and applications will remain relevant – mostly for data sensitivity, security and compliance requirements. Most organizations will thus have to support hybrid and multicloud infrastructures that include on-premises, private cloud and multiple public cloud environments. IoT and edge deployments – often a match for cloud-native technology such as containers and Kubernetes – are also growing and are increasingly viewed as yet another venue for hybrid approaches.

Increased end-to-end automation can also help organizations improve consistency between development and production environments. With the continued uptake of hybrid cloud and cloud-native technologies comes increased complexity. This is another area where organizations will likely lean on automation to simplify, accelerate and drive efficiency in their DevOps processes.



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