Techstrong Research

DevOps Next: 2024 and Beyond

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The Impact of DevOps

DEVOPS, once a novel idea, has now become a widely adopted practice, significantly changing how we approach software creation. It has successfully navigated the storms of inflated expectations and the trough of disillusionment, proving its applicability throughout the Software Development Lifecycle (SDLC).

DevOps began with the desire to close the divide between development and operations and eliminate decades of "over-the-wall" software delivery to Operations. DevOps' originators knew there must be a better way.

DevOps, often misconstrued as a technology or a set of tools, is in fact a philosophy that fosters a culture of collaboration. It guides how we develop software, breaking down job role and organizational boundaries. In essence, DevOps is not about tools, but about fostering a collaborative environment, much like how carpentry is about the craft of designing and creating quality wood objects.

DevOps was built and has matured upon a collection of principles and concepts borrowed from Agile, Toyota manufacturing, Deming's Total Quality Management, Lean manufacturing and Eliyahu M. Goldratt's Theory of Constraints (to name a few). DevOps implemented concepts like shortened feedback loops, continuous improvement, smaller units of work, shorter cycles, continuous workflow, removing roadblocks and cross-functional collaborative teams.

Since its humble beginnings, DevOps adoption hasn't occurred linearly, often beginning with a few organic projects in an organization or at the launch of software startup companies. Progress has been steady, as evidenced by this study and other research, including DORA. DevOps has seen adoption ranging from enterprise-scale to small software teams. Four out of five DevOps Next survey respondents from small (19.9%), medium (23.8%), and large businesses (56.3%) state using DevOps is a given or is used regularly, with some specific exceptions.

Because of DevOps' emphasis on automation, support for smaller units of work, continuous integration and deployment (CI/CD) and workflow pipelines, DevOps rise, paralleled the move to cloud native software architecture comprised of microservices, containers, container orchestration and distributed workloads. Implementing cloud native applications without DevOps would be difficult, if not impractical.

But DevOps isn't finished evolving just yet.

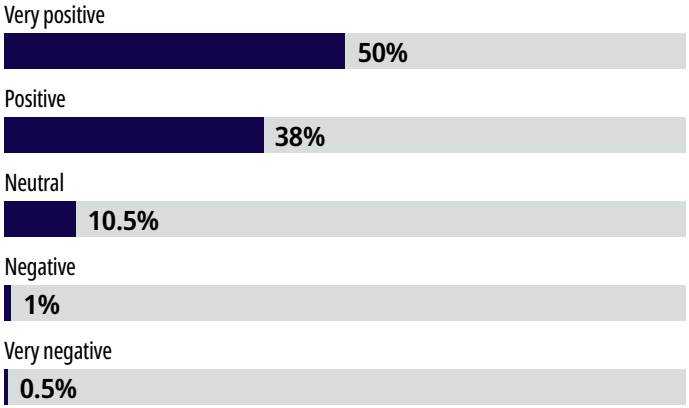
DevOps Next: The Future of DevOps

Since its early beginnings, DevOps has evolved from the concepts that brought together dev and ops and reshaped the work of software creation and delivery into an umbrella set of shared principles for a growing family of XOps technical and business disciplines.

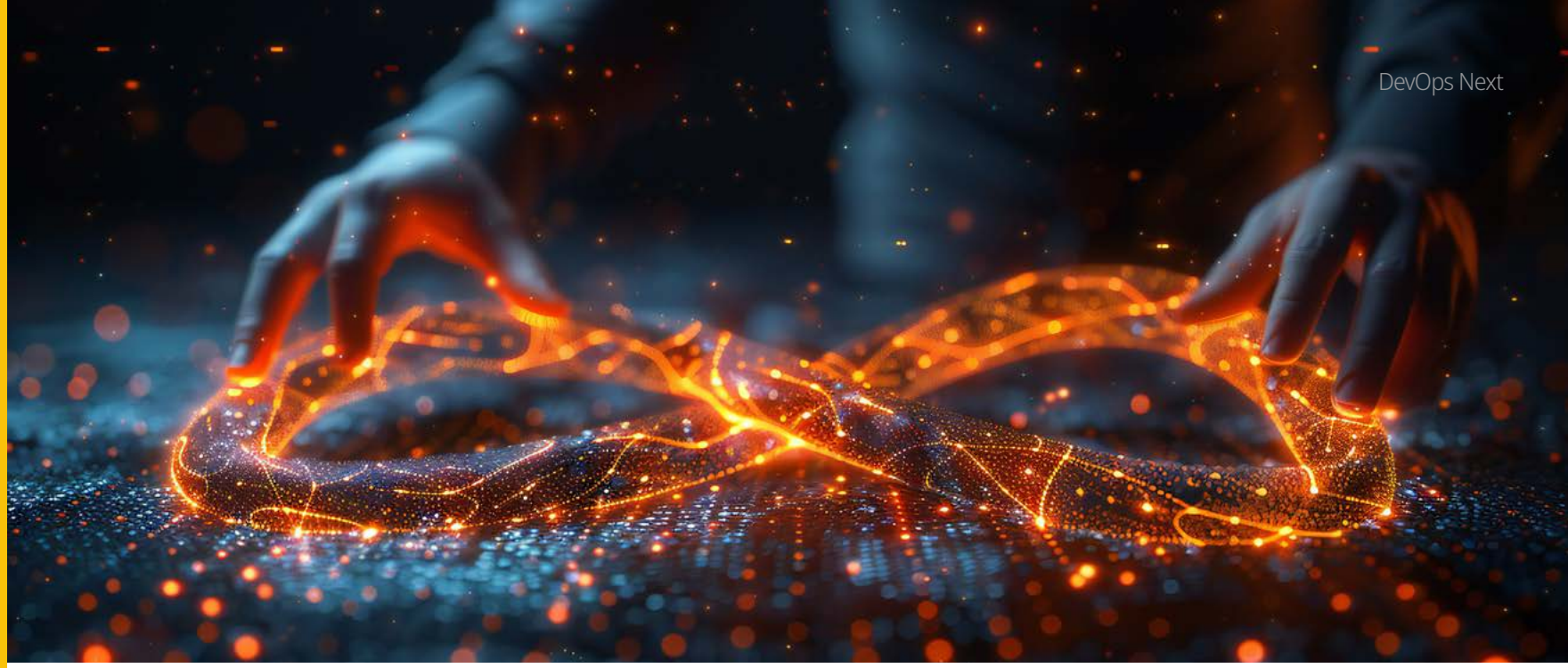
The principles that have made DevOps successful are not limited to DevOps. They have fostered the creation of new disciplines, demonstrating the adaptability of DevOps to the changing needs of software, operations and the business. DevOps-influenced disciplines include platform engineering, System Reliability Engineering, DevSecOps, DataOps, FinOps and AIOps. Page x (XOps: The Long Tail of DevOps)

DevSecOps began by shifting left and placing more of the security burden on developers. As organizations continue to embrace cloud-native architectures, microservices, and continuous delivery pipelines, building security seamlessly into every stage of the development process is essential. APIs, development tools and software developers are target-rich attack vectors. DevSecOps must evolve beyond application security to address security holistically, including the underlying toolchains, workflows throughout the SDLC and software supply chain security.

How would you describe the future for DevOps?



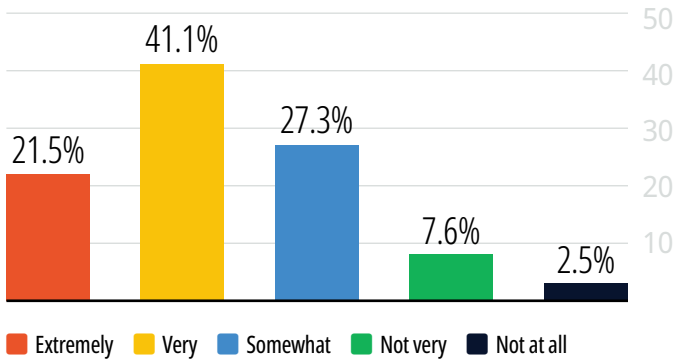
> *DevOps is no longer a nice-to-have; it's imperative for business. Agile organizations that have mastered DevOps methodologies and leveraged agile software, automation, and CI/CD pipelines are seeing a dramatic uptick in release velocity. DevOps is the cornerstone of modern software development lifecycles, enabling rapid innovation, improved quality, and increased time-to-market. Organizations that fail to embrace DevOps will find themselves at a distinct disadvantage as competition intensifies.*
>
> **—Paul Nashawaty, Practice Lead for Application Development, The Futurum Group**



AI significantly impacts DevOps and software development today by enhancing productivity, code quality, and intelligent automation. Page x (AI Use In DevOps) Soon, AI/ML will analyze historical data to optimize CI/CD pipelines and predict build failures, suggest efficient configurations, validate changes before deployment, and optimize all types of resources. With the importance of edge computing, DevOps practices are expanding to these distributed architectures and platforms, delivering consistent and reliable deployment pipelines across environments.

DevOps practitioners report that DevOps increases the velocity and frequency of delivering new capabilities into production. Overall, they see a positive future for DevOps, with 81.1% of respondents seeing DevOps' future as positive or very positive. For all these reasons and more, our research shows DevOps is entering its next era of evolution, what we call ***DevOps Next***.

How valuable is AI-augmented DevOps in terms of improving teams' ability to achieve DevOps goals?



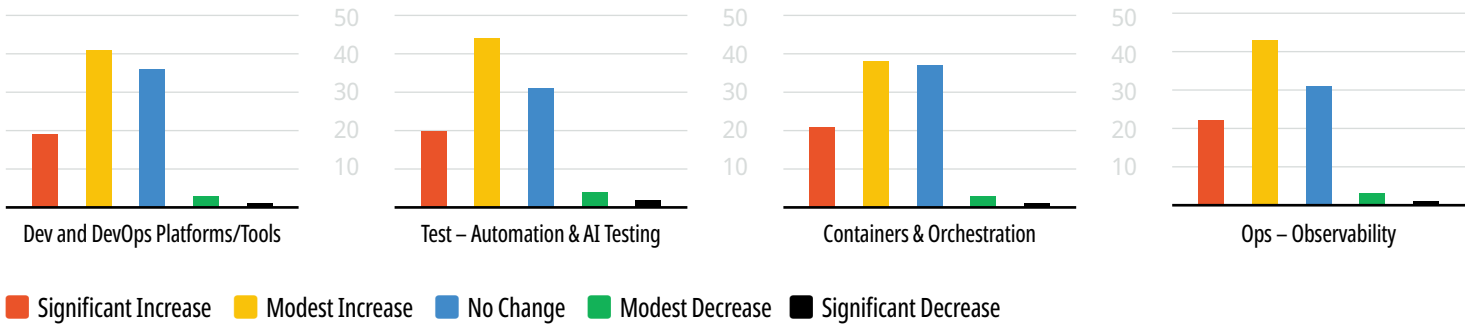
A View into DevOps Investment

The DevOps market is sizable and growing substantially, from USD $10.4 billion in 2023 to an estimated USD $25.5 billion by 2028 (DevOps Market Report 2028, Markets and Markets). To understand where DevOps practitioners plan to invest or pull back in 2024 and 2025, we examined five areas: tools and platforms, testing, cloud native, observability, infrastructure as code (IaC) and application security.

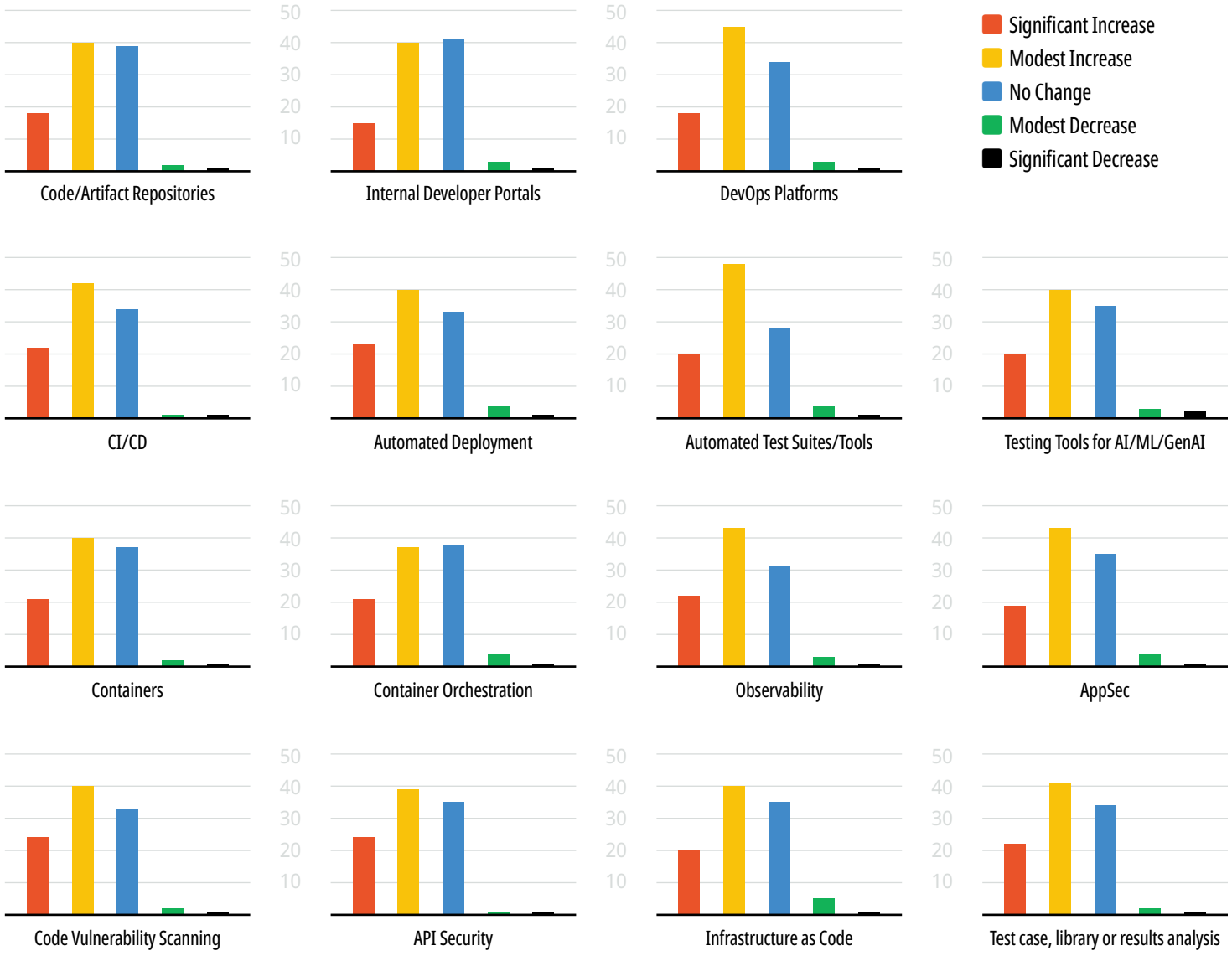
Our data clearly shows modest to significant investment in DevOps technologies and services across all five categories over the next 12 to 24 months, with very few respondents decreasing spending during this time period. Development (41.5%) and testing (43.8%) lead the areas of modest investment, where those investing significantly in DevOps showed small variances across the five categories (19.7% to 22.4%)

The accelerated move to digital products and experiences, the need to use software to compete and reach customers and partners, the near-ubiquitous cloud, accelerated development processes (DevOps), and AI-augmented development and testing technologies are some drivers of these investments.While no one technology category stood out far above the others in our study, the continuous growth of investments in DevOps across the SDLC is a reason to maintain a positive DevOps outlook.

Average Investment by Technology Category



Average investment by Technology Category

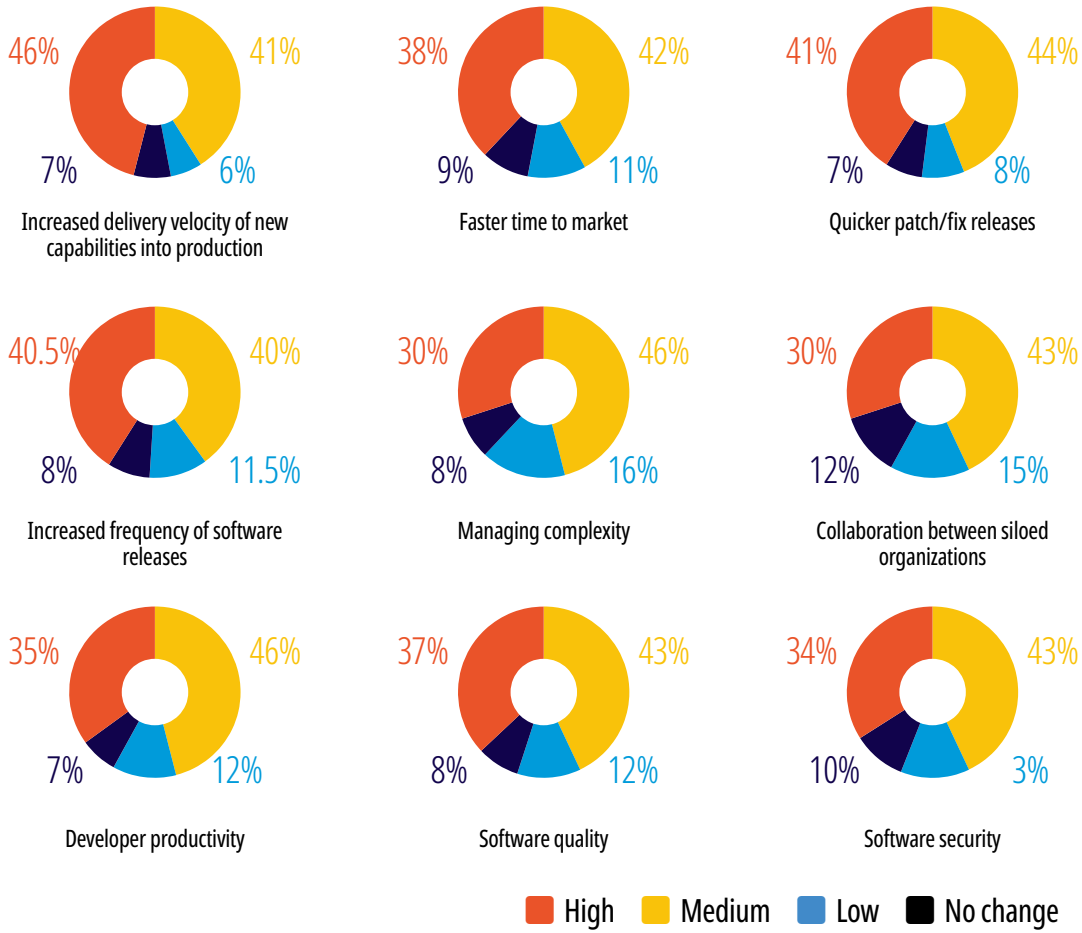


The Value Delivered by DevOps

Software teams are constantly pressured to deliver new capabilities through software. Our research examined nine critical areas of software creation to better understand where using DevOps lives up to its potential.

One of this report's most significant findings is that nearly half (45.6%) of software organizations say DevOps increases their velocity to deliver new capabilities into production. When considering both high and medium responses, the value DevOps delivers to increasing software delivery velocity jumps to an impressive 81.1% of respondents.

How has DevOps impacted the value your organization delivers to the business?



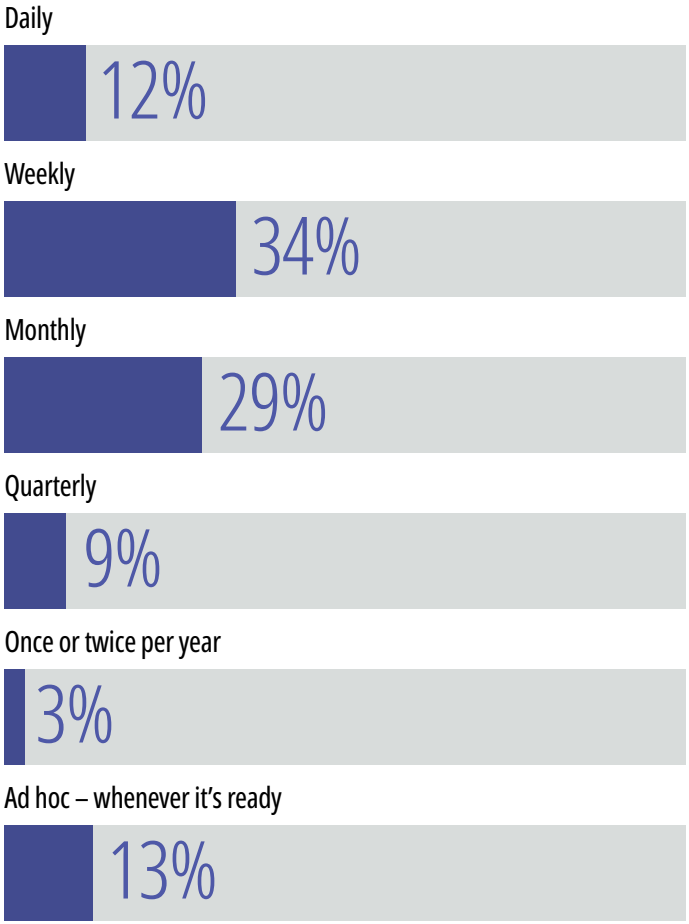
The Value Delivered by DevOps (continued)

Additionally, DevOps increases the frequency of software releases (40.6%) and the speed of delivering software fixes (41.2%) from respondents assessing DevOps impact as high in these areas. DevOps software teams are releasing code more frequently, with software delivered into production on a daily (11.8%), weekly (34.1%) and monthly (29%) basis.

When considering all nine critical areas of software creation together, the average score of respondents who rated DevOps impact as high was 36.85%, and medium was 41.3%. It is also important to note that DevOps must operate in a complex ecosystem of technologies, appsec, dynamic infrastructure, DevSecOps, platforms and system reliability engineering.

> *Back in the earliest days of DevOps, our attention was limited to a symptom — namely, the frequent clashes between Dev and Ops. Little did we know that the threads we were collectively pulling on would change how we build, deliver, and operate high-performing software systems. We've seen leaders achieve speed and scale that we previously could only imagine. Now the advances continue as we see organizations finding better ways to improve how they work.*
>
> **—Damon Edwards,**
> **Early Organizer of DevOps Days**

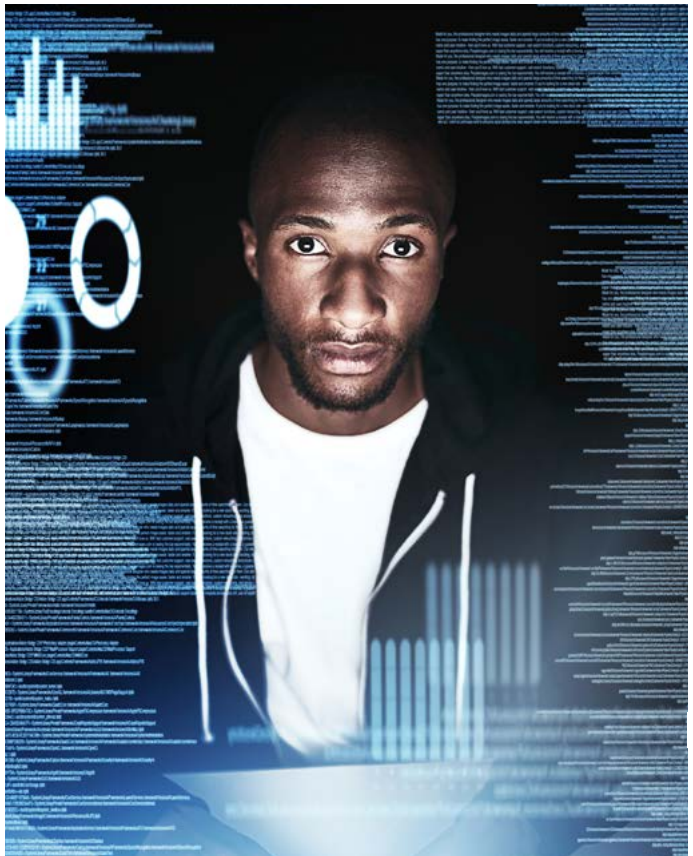
How frequently does your organization release new code into production?



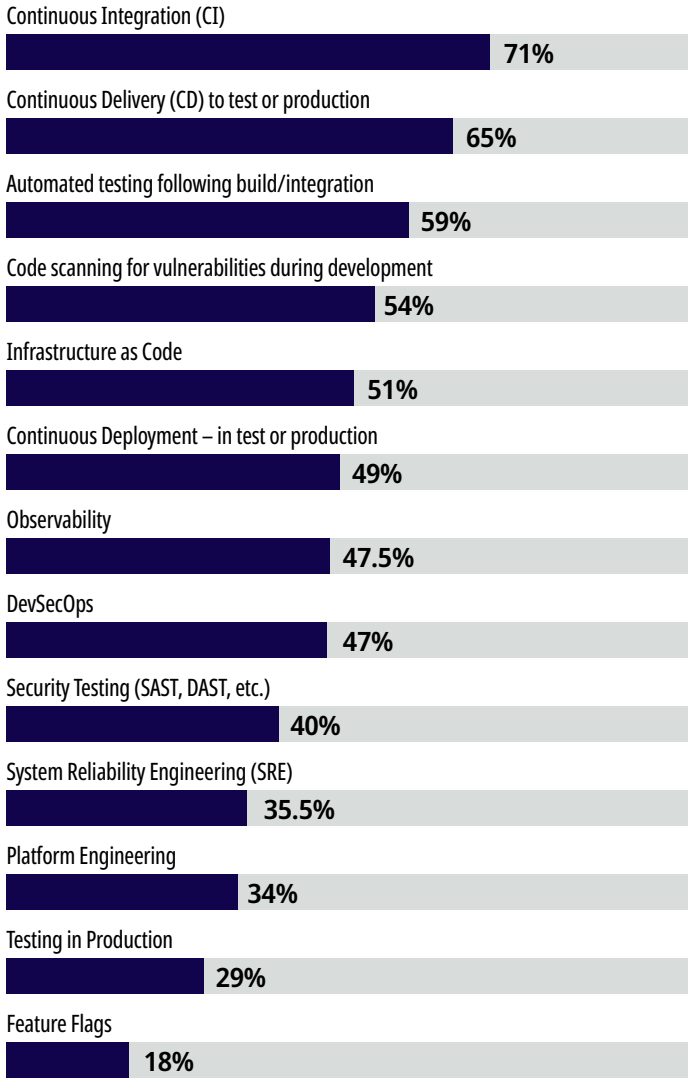
The Value Delivered by DevOps (continued)

Still, DevOps still has room for improvement. Respondents rated DevOps' impact as low in managing complexity (16.3%), increasing collaboration between silos (14.8%) and improving software security (13%).

The bottom line; Few investments in technology, software methodologies or processes deliver the same or greater tangible value than DevOps has achieved.



Which of the following does your organization regularly practice?



DevOps Adoption and Maturity

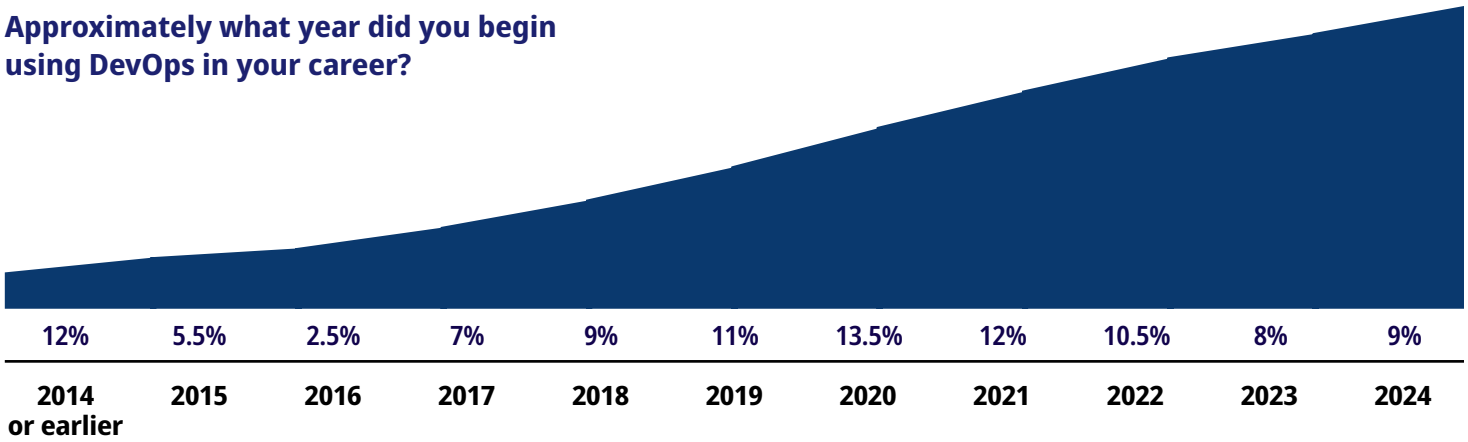
Since DevOps' humble beginnings at the first gathering in Ghent, Belgium (2009), our 2024 research of organizations practicing DevOps shows broad adoption and continued growth. Years 2020 (13.5%) and 2021 (12.3%) show the highest adoption of DevOps amongst our DevOps Next survey respondents, reflecting the industry's expanding interest in more effective approaches to creating software.

However, the real success story lies in that 60.4% of DevOps practitioners in our study have been applying DevOps for five or more years, having adopted DevOps in 2019 and earlier. These practitioners built a body of knowledge and experience for others who followed, a testament to the community of DevOps practitioners.

2023 showed a drop in respondents (8.2%) who began using DevOps, though slightly more (8.6%) began using DevOps in the first half of 2024. 2024 will likely end up with an equal or greater number of people taking their first steps towards using DevOps in their careers. It's also important to consider that the practice of DevOps has expanded into new roles responsible for implementing and supporting DevOps, specifically platform engineering, system reliability engineering (SRE), DataOps and AIOps.

Over half of our respondents (55.8%) have reached higher levels of DevOps maturity. This respectable percentage reflects their confidence in the effectiveness of DevOps. Within this group, 34.4% are standardizing

Approximately what year did you begin using DevOps in your career?



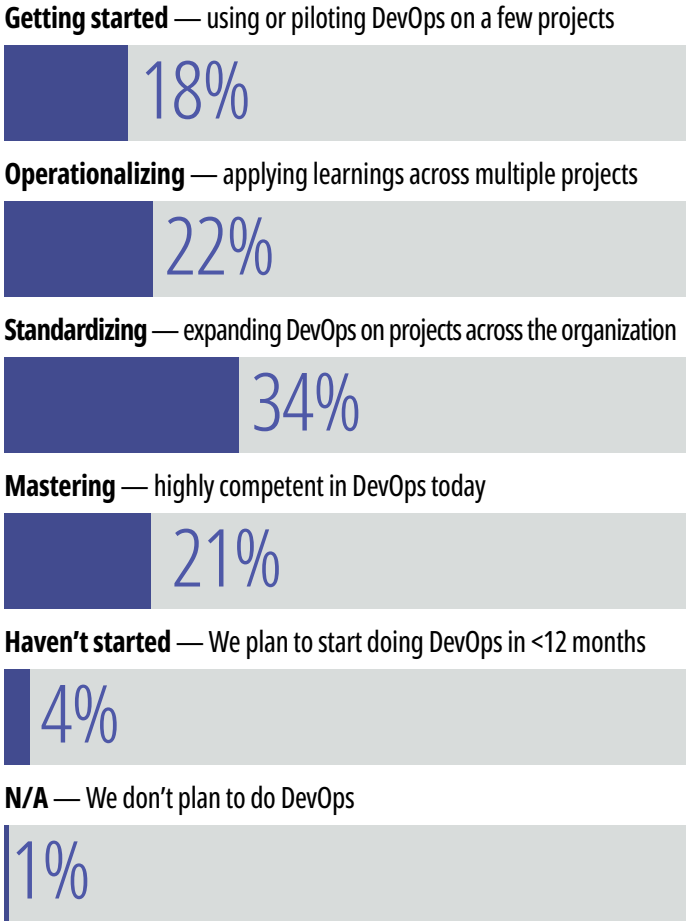
DevOps Adoption and Maturity (continued)

DevOps on projects across their organizations, and 21.5% indicate they have reached a mastery level of DevOps, demonstrating high competence in applying DevOps today.

DevOps use continues to grow, with a healthy 18.1% indicating they are piloting DevOps on a subset of projects, and 21.8% are applying DevOps learnings across multiple projects. 3.9% indicate they plan to start using DevOps in the next 12 months. We suspect this small percentage of DevOps newcomers is one indicator of widespread adoption of DevOps across the industry or a division of DevOps efforts into multiple disciplines (platform engineering, SRE, SecOps, etc.)

Organizational size does influence the maturity levels seen, but only slightly. Organizations with over ten thousand employees show advanced levels of DevOps maturity at 57.1%, while those in organizations under ten thousand dip slightly to 53.4%. Of the respondents in our survey, a little under a third (30.2%) are in larger organizations and just over two-thirds (69.8%) are in smaller enterprises, medium and small businesses.

Which of the following best describes your organization's current level of DevOps maturity?



AI Use in DevOps

AI/ML, particularly generative AI, dominates the current conversation about software development and testing. Our research shows AI's time has arrived, and contributors across the software development lifecycle (SDLC) have quickly begun experiencing tangible gains in productivity, software quality, and career advancement. (See "AI-Augmented DevOps" callout).

Organizations are using AI in development today (32.7%) or are considering using AI in development (41.5%). A smaller portion is waiting it out and does not use AI in development today (16.2%) and has no plans to consider using AI (5.7%).

Among mature "DevOps unicorns" or those broadly standardizing DevOps across their organizations, software teams using AI are significantly (30%) more likely to rate their team as extremely or very effective.*

While AI has already made significant strides in development, it's important to note that we are still in the early stages of its use in software development, testing, and DevOps. We anticipate a continuous stream of innovations and advancements as technology vendors explore and develop new applications for AI in DevOps. The future promises even greater potential.

AI-AUGMENTED DEVOPS

"AI's productivity gains are most significant in development and testing, with 60% reporting that developers are more productive due to AI and 42% reporting productivity gains in testing and QA."

— AI-Augmented DevOps: Trends Shaping the Future, Techstrong Research, 2024

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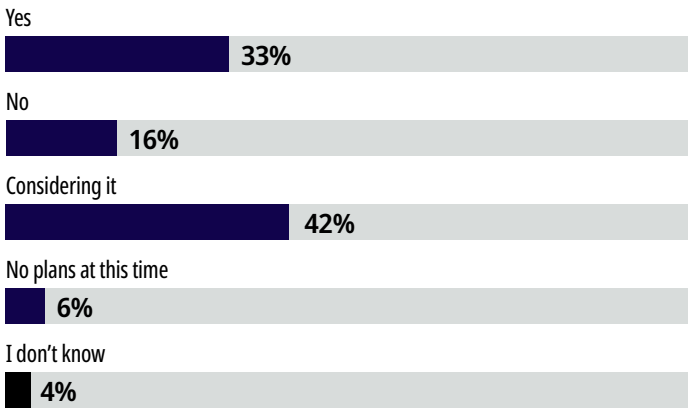
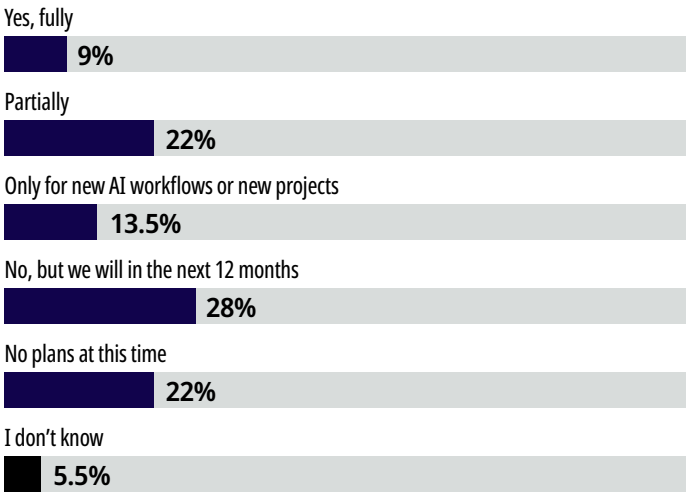
AI Use in DevOps (continued)

Is your organization using AI in development to build software?



Have you integrated AI workflows into your DevOps pipelines?



> *In the realm of DevOps, we're in the initial stages of integrating AI, analogous to the crawling phase of the crawl-walk-run progression. This early period is marked by foundational experimentation, development, and testing. As we advance, AI's role in DevOps will grow more sophisticated. Eventually, we will reach a stage where AI significantly optimizes and improves the DevOps experience.*
>
> **—John Willis, author**

DevOps Across the SDLC

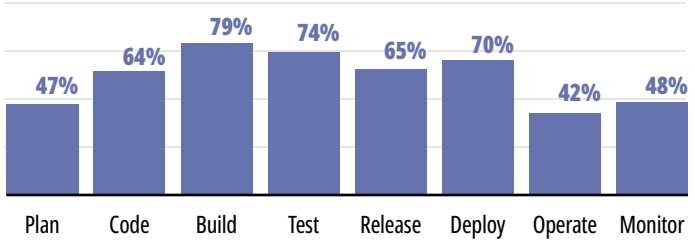
DevOps principles and practices are applied across all Software Development Lifecycle (SDLC) phases. While the adoption of DevOps is significant, it's intriguing to understand how the use of DevOps is faring across software projects within organizations.

Our study data shows that DevOps is used across large numbers of projects in software organizations, with nearly three-quarters (72.7%) using DevOps on 50% or more of their projects. It's notable that 18.7% of respondents use DevOps on all projects, and 32.8% use DevOps on three-fourths of their projects.

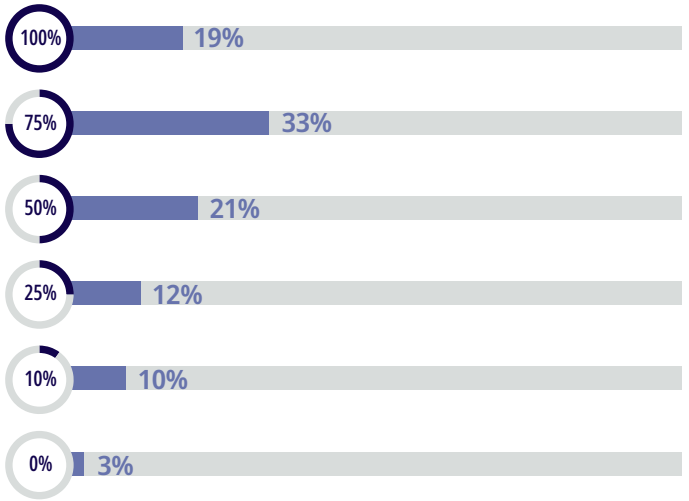
The heart of DevOps is the software build step, where software components are integrated together, or "continuously integrated," through the Continuous Integration/Continuous Delivery (CI/CD) process, resulting in executable code. As expected, the Build and Test SDLC phases show the highest use of DevOps at 78.6% and 72.4%, respectively.

While most software teams begin applying DevOps in CI/CD, research data shows that DevOps is also heavily used in the Code, Release and Deploy SDLC phases, at 62.8%, 62% and 66.9%, respectively.

What aspects of your software development projects typically apply DevOps?



What percentage of your projects are applying DevOps in their software development lifecycle?

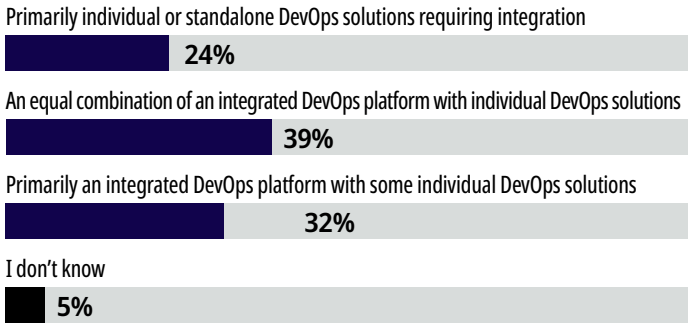


From CI/CD To Platforms

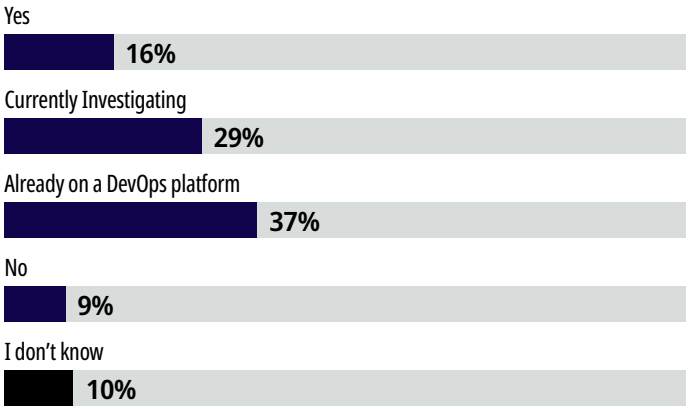
The heart of DevOps is the continuous integration / continuous deployment, or CI/CD, where software is built, integrated and deployed by every DevOps toolchain. CI/CD is where most DevOps adoption efforts start, as it benefits greatly from automation and integration as developers check code into the project repository.

In our survey, 29.6% of respondents reported using 4 or more CI/CD solutions in their organizations. This often happens because the adoption of DevOps is uneven across different parts of the organization, and projects often need to support diverse technical requirements such as programming languages, configurations, and testing.

What is your organization's most common approach to using DevOps solutions and technology?



Will you move to an integrated DevOps platform solution over the next 12-18 months?

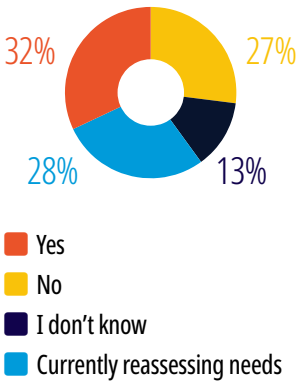


From CI/CD To Platforms (continued)

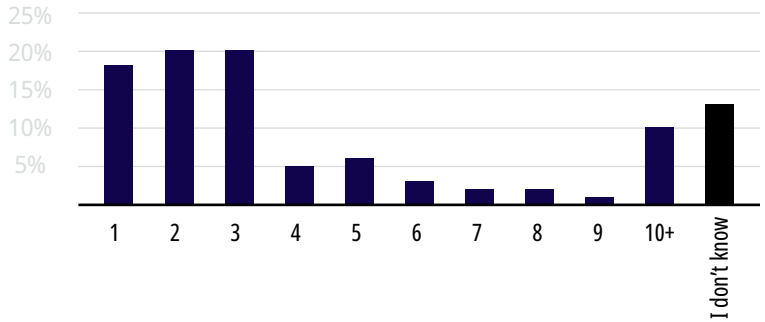
Today, we are witnessing a new era of DevOps technologies that surpass the individual toolchain point solutions of its early years. DevOps tools are purpose-built for DevOps environments and increasingly are delivered as a platform, spanning the functions across phases of the SDLC, bolstered by software control planes, data management, security, and AI. 32.3% of respondents primarily use DevOps delivered as a platform while 39% use a combination of platforms and integrated toolchains. The need for integration, efficiency, centralized management, scalability, security, and cost-effectiveness drives the growing preference for DevOps platforms over individual tools.

As DevOps offerings continue to evolve, platforms offer comprehensive, modular, and scalable solutions and are likely to remain the top choice for practitioners aiming to optimize their development, testing and deployment workflows. 15.8% of respondents say they will switch to the DevOps platform approach, and another 2.86% say they are in the investigation stage. A comprehensive platform approach lessens DevOps administrative duties for integrating and maintaining multiple DevOps tools, integrations and technologies.

Are you considering replacing or upgrading one or more of your CI/CD solutions in the next 12-18 months?



How many CI/CD platforms or solutions does your organization use?



Cloud Native's Partnership With DevOps

DevOps and cloud native software architecture (microservices, containers and orchestration) are mutually beneficial. It can even be argued that delivering microservice software components at velocity isn't possible without utilizing DevOps.

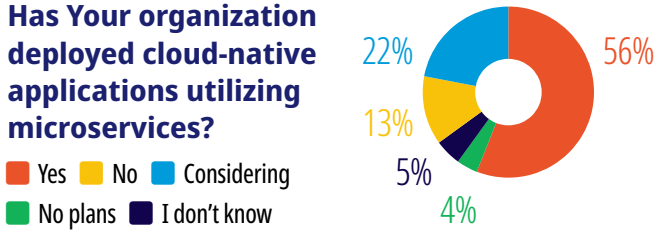
The two are a natural fit because hundreds, even thousands, of an application's microservices are created and updated in frequent development and test cycles. DevOps automation, particularly in CI/CD and software testing automation, enables microservice development cycles to occur very rapidly and more frequently.

An impressive 56% of respondents to our research have cloud native applications deployed in production today, and 21.9% are considering the move to cloud native. While DevOps applies to almost any software architectural approach, cloud-native is likely the most dependent upon DevOps.

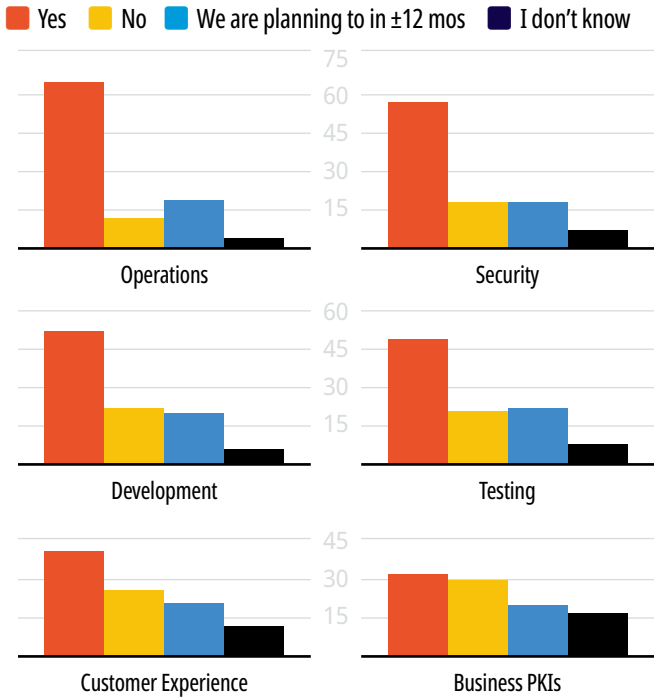
In parallel with DevOps, observability technologies (commonly defined as alerts, logs and traces) gained traction is operational environments. Some of observability's benefits traditionally fall outside the realm of DevOps, cloud native is particularly reliant on distributed tracing capabilities to diagnose and resolve problems in a dynamic and ephemeral microservices application.

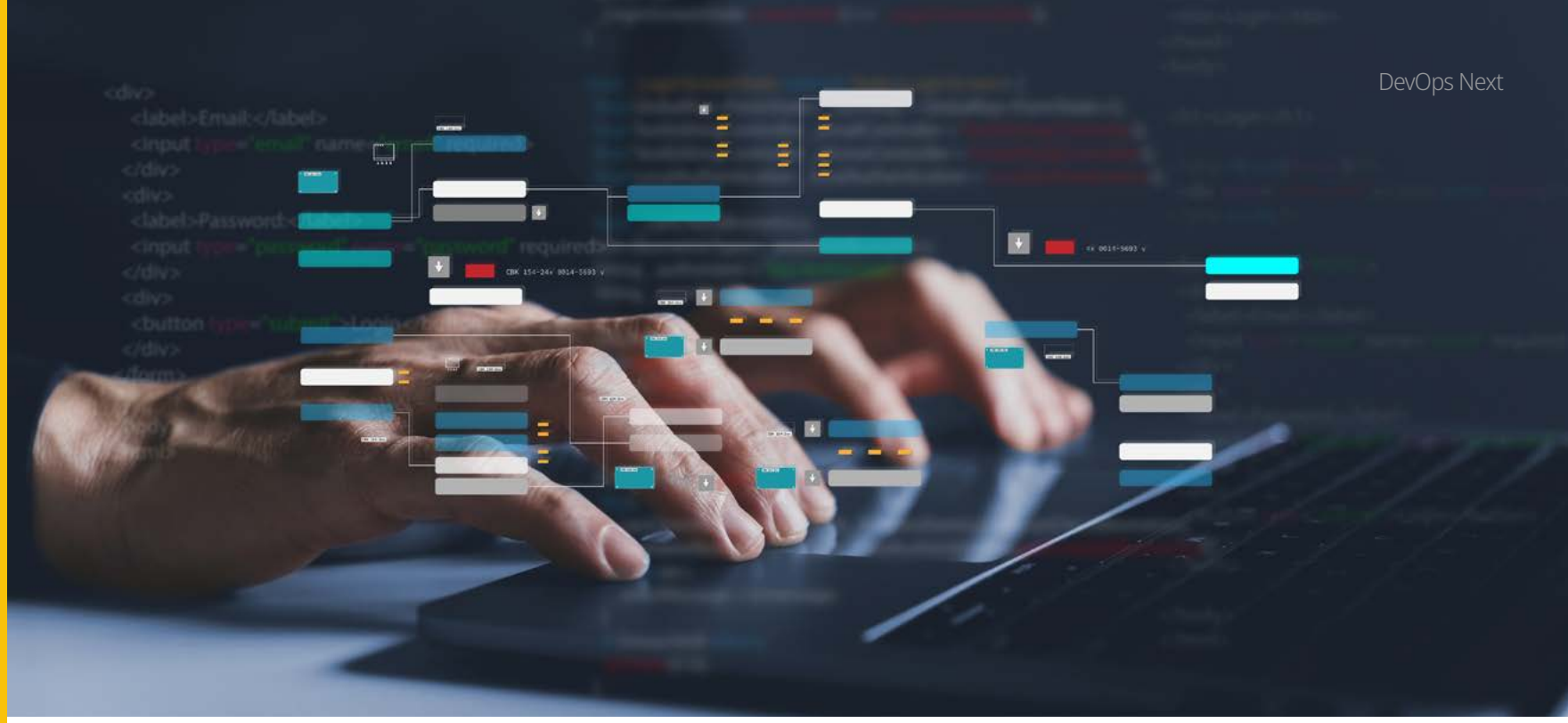
Observability has also gained significant traction in SecOps organizations and is increasingly utilized in development, testing and other areas of the SDLC.

Has Your organization deployed cloud-native applications utilizing microservices?



Does your organization utilize observability tool(s) in these parts of the business?



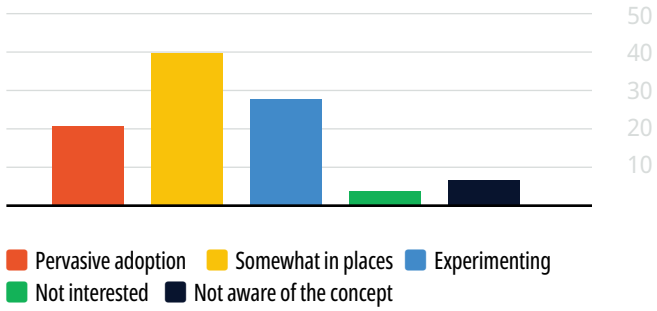


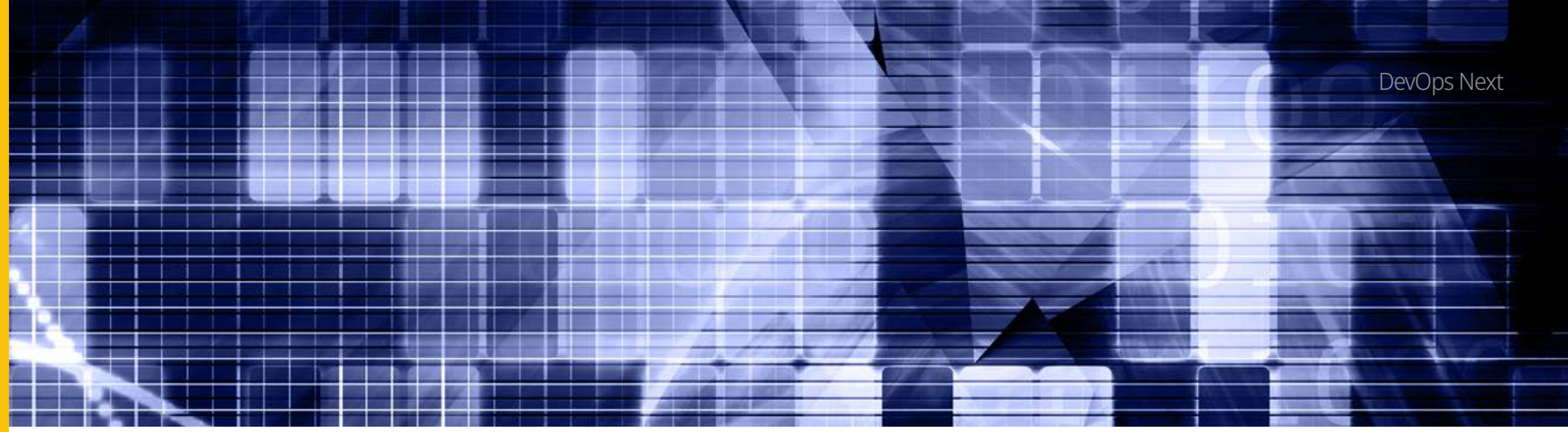
The Rise Of Platform Engineering

Platform engineering has become an important discipline in software development, cloud and IT operations. 60.9% of respondents to our research are applying platform engineering in some areas or pervasively across IT.

Many factors likely contributed to the rise of platform engineering; the increasing complexity of modern applications (48.5%), the need for standardization of configurations (57.8%), improving developer productivity (58.9%) and reducing costs (50.5). At the same time, System Reliability Engineering, which is focused on performance,

How would you characterize your organization's embrace of platform engineering?





The Rise Of Platform Engineering (continued)

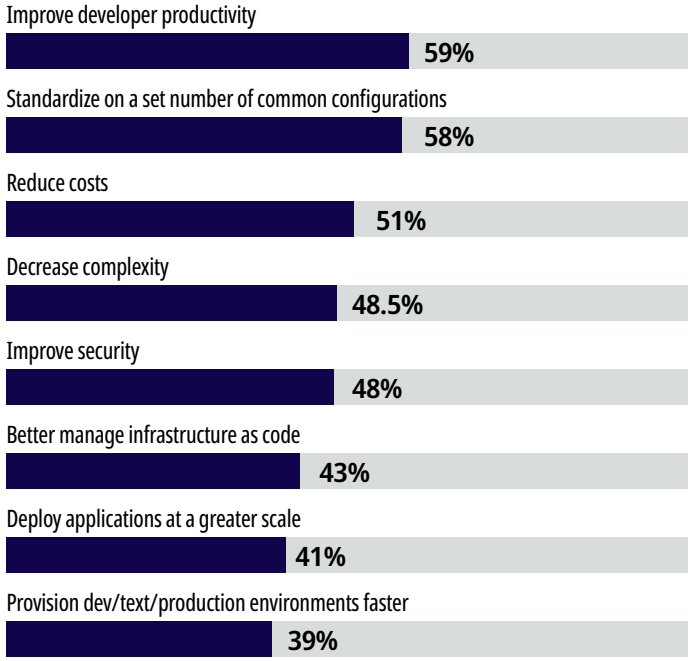
reliability, and resilience, has gained a strong foothold among our research respondents (35.3%).

While some have claimed that "DevOps is dead" and platform engineering has replaced the need for DevOps, many more see them both as important and synergistic.

By bringing together various functions in IT organizations, platform engineering strongly emphasizes its customers in development, operations, infrastructure, and security. This customer-centric approach focuses platform engineering's outputs on its respective customers' needs and requirements, contributing greatly to its success.

The lines between where DevOps ends and platform engineering begins vary from organization to organization. In some cases, platform engineering incorporates the work of supporting and security technologies that comprise the DevOps toolchain.

Why are you adopting platform engineering?



DevOps and Sustainability

Sustainability is becoming increasingly crucial as organizations recognize the environmental impact of their technology practices and infrastructure. By integrating sustainable practices within DevOps, companies aim to reduce their carbon footprint and promote more efficient use of cloud and data center resources. This includes optimizing cloud infrastructure to ensure that only necessary resources are consumed, thereby minimizing energy usage.

Additionally, automated processes in continuous integration and continuous deployment (CI/CD) pipelines can be configured to reduce unnecessary builds and tests, which

> *The findings reveal that DevOps is leading the way in sustainability efforts, highlighting its key role in using resources efficiently. Interestingly, the energy use of AI/ML and general AI processing isn't yet a major focus, suggesting that many organizations might not have fully realized or measured the energy demands of these emerging technologies.*
>
> **—Bonnie Schneider, Sustainability Analyst, EcoTechInsights Editor, Author and award-winning meteorologist**

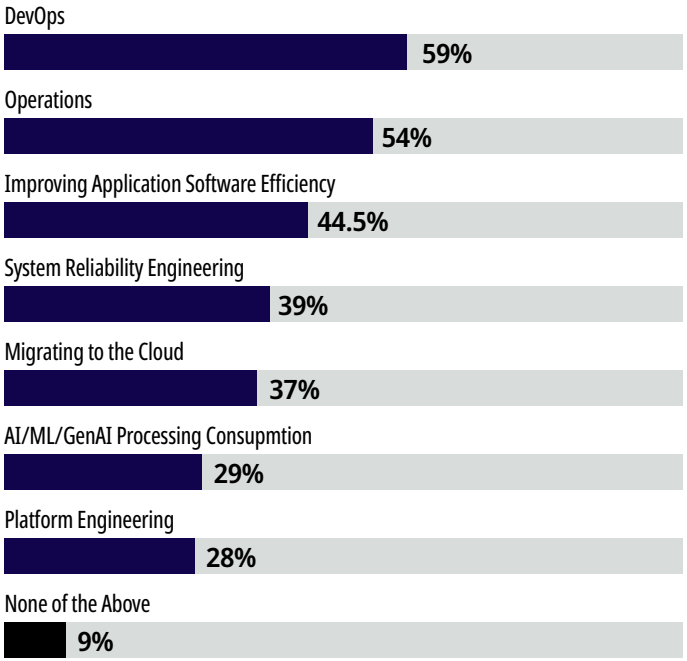
DevOps and Sustainability (continued)

conserves computational power and energy. DevOps teams are also encouraged to consider the lifecycle of their applications and infrastructure, focusing on long-term efficiency and resource optimization, which not only supports sustainability goals but also leads to cost savings.

Many sustainability principles align well with the DevOps culture of continuous improvement and innovation. Sustainable DevOps practices can drive technological advancements by encouraging the adoption of energy-efficient coding standards and promoting the use of renewable energy sources for data centers. Collaboration between development and operations teams can lead to innovative solutions that reduce environmental impact, such as containerization and serverless architectures, which optimize resource use.

Ultimately, integrating sustainability into DevOps not only supports environmental objectives but also fosters a culture of responsibility, innovation, and efficiency.

Does your organization have a sustainability effort related to:



XOps: The Long Tail of DevOps

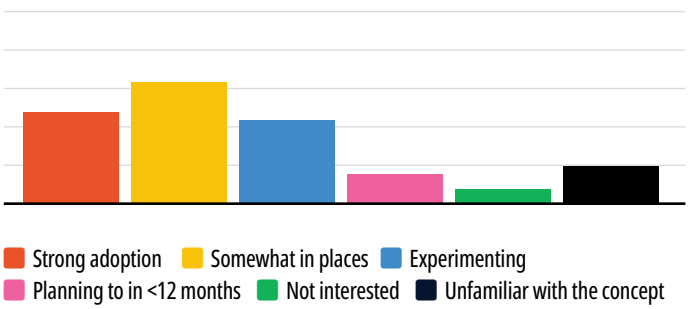
The principles and ideas that define DevOps have significantly influenced the creation of other XOps. At the core of DevOps is the emphasis on collaboration, automation, and continuous improvement, which has inspired new ways of performing old work, like GitOps, FinOps, DataOps, and SecOps.

GitOps applies the principles of version control and automation to infrastructure management, enabling teams to manage infrastructure as code with the same rigor and collaboration as application code, thereby ensuring consistency and reliability. Similarly, FinOps extends the DevOps ethos of collaboration to financial operations, empowering organizations to manage cloud costs effectively by promoting visibility, accountability, and real-time insights into spending.

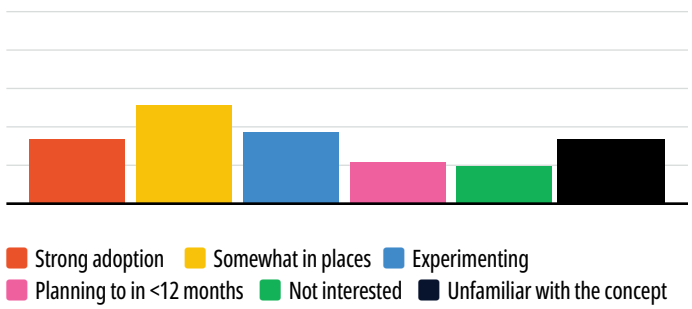
DataOps and SecOps further illustrate the cross-pollination of DevOps principles. DataOps adapts the DevOps focus on agility and automation to the field of data management, enhancing the speed and accuracy of data analysis through streamlined data workflows and continuous integration of data analytics processes. This approach fosters a more dynamic and responsive data environment, crucial for businesses that rely on real-time data insights. SecOps, or DevSecOps, integrates security practices within the DevOps workflow, ensuring that security considerations are an integral part of the development and deployment processes.

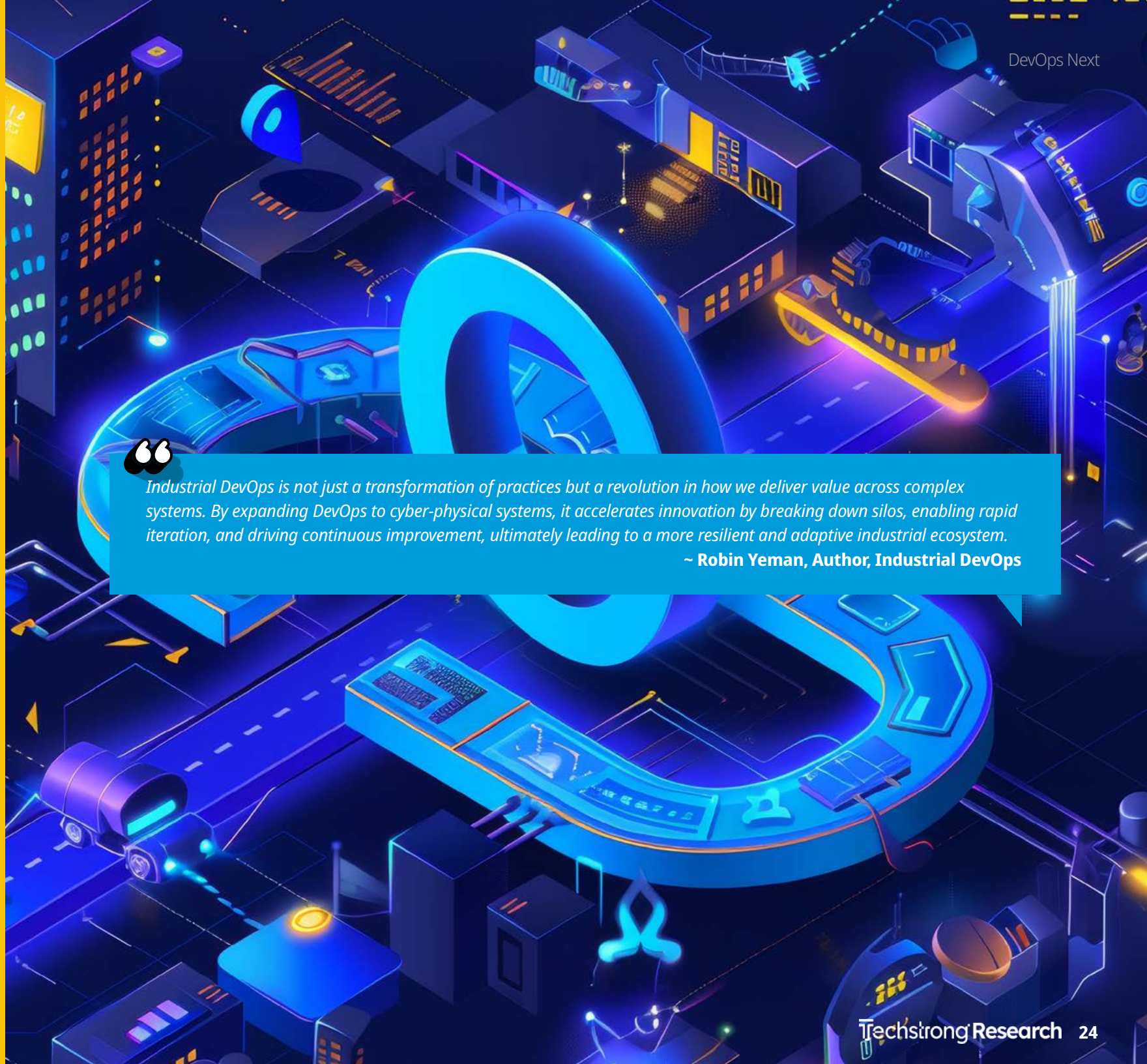
Across these domains, the infusion of DevOps principles fosters a culture of collaboration, efficiency, and continuous improvement, driving innovation and enabling organizations to respond more rapidly to changing market demands.

How would you characterize your organization's embrace of GitOps?



Does your organization have a FinOps initiative to manage cloud spending and other costs?



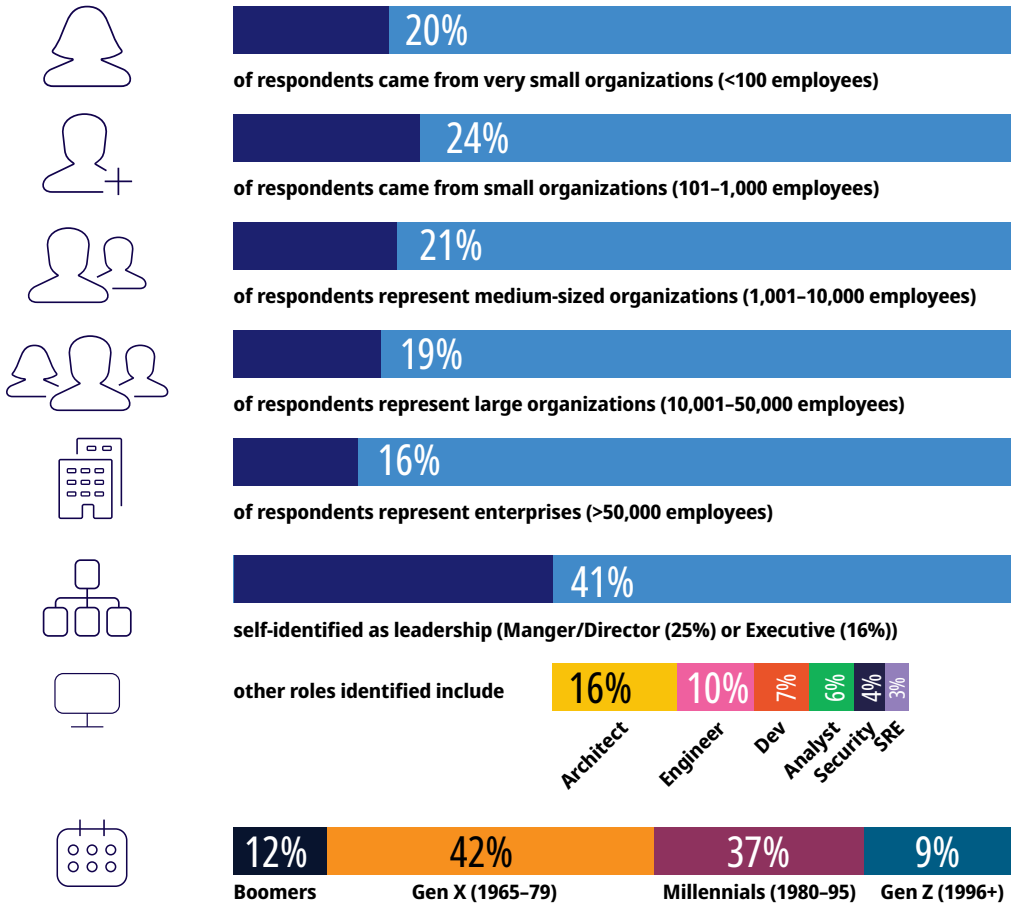


> *Industrial DevOps is not just a transformation of practices but a revolution in how we deliver value across complex systems. By expanding DevOps to cyber-physical systems, it accelerates innovation by breaking down silos, enabling rapid iteration, and driving continuous improvement, ultimately leading to a more resilient and adaptive industrial ecosystem.*
>
> **~ Robin Yeman, Author, Industrial DevOps**

Survey Demographics

Techstrong Research conducted an IT study of 326 DevOps, software development, testing and platform engineering practitioners. The survey was conducted during Q2/Q3 2024.

Respondents hold a variety of roles and come from a broad range of organizational sizes:



Survey responses came from a global cross-section of 62 countries in four major regions: **North America (41%), UK+Europe (19%), APAC (22%)** and **LATAM (5%).**

Twenty industries were surveyed, including:

Information Technology	34%
Financial Services and Insurance	17%
Business Services	6%
Manufacturing	6%
Healthcare	5%
Telecom	5%

About the author

MITCHELL ASHLEY is a technology executive and entrepreneur who is an advisor, analyst, product creator and tech leader, bringing 30+ years in cybersecurity, cloud, AI, product development, software engineering and networking. Mitch is Chief Technology Advisor with The Futurum Group and CTO of Techstrong Group's platforms covering digital leadership, DevOps, cybersecurity, AI, cloud native, cloud infrastructure, platforms and ITSM. As a CTO, CIO, and VP of Engineering, Mitch led the creation of award-winning cybersecurity products utilized in the private and public sectors, including the U.S. Department of Defense.As CEO and President, Mitch also led business and technology for managed PKI services (broadband, Wi-Fi, IoT, energy mgmt. and 5G industries), product certification test labs and a SaaS business (93m transactions annually) and the engineering of the first video-on-demand, Internet cable services, national broadband network deployment and multiple telecom apps.

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About Techstrong Research

Techstrong Research accelerates the adoption of disruptive technologies that drive business outcomes and provide actionable strategies in rapidly changing markets. We are the only organization serving the needs of IT leaders, practitioners and the industry ecosystem with research, analysis, content, events and education. We bring deep knowledge about today's leading technologies such as DevOps, cloud, data and AI/ML, security/governance initiatives and supporting infrastructure. We offer our customers a holistic business perspective essential to adapt and thrive in the digital economy. The Techstrong Research team has the knowledge, experience and credibility earned by working with hundreds of businesses across many industries to provide consulting, thought leadership and research services.

Techstrong Research is relentlessly focused on the business outcomes of disruptive technologies.