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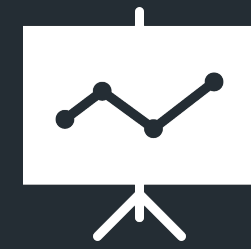
Cloud-native Applications

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FEBRUARY 2022

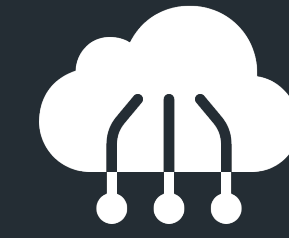# KEY FINDINGS / TABLE OF CONTENTS

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Research Objectives

Today's businesses are evolving rapidly to meet the demands of their customers, but traditional and heritage applications often do not meet the requirements. IT organizations are trying to keep their businesses running while migrating to new, modern approaches to advance the business into the future. Many organizations are taking a "cloud-first" approach to their digital transformation initiatives, which requires building, maintaining, and operating a developer-ready infrastructure without impacting developer velocity.

To understand cloud-native application trends, including bridging the gap between container development, Kubernetes, and IT operations through CI/CD pipelines, ESG surveyed 387 IT professionals at organizations in North America (US and Canada) responsible for evaluating, purchasing, managing, and building application infrastructure.

THIS STUDY SOUGHT TO:

Understand how businesses are approaching cloud-native application orchestration.

Explore microservices-based, containerized application environments, including benefits and challenges.

Investigate how teams are solving complex issues at different layers of the application stack.
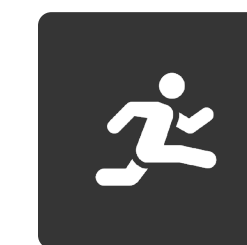
Gain insight into the impact of developer velocity.

Note: Totals in figures and tables throughout this eBook may not add up to 100% due to rounding or organizations choosing more than one answer to select questions.

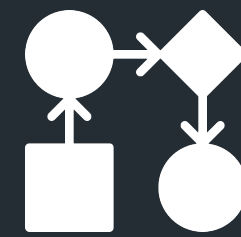# Cloud-native Application Strategies Are Becoming More Common in Conjunction with Ubiquitous Public Cloud Usage

Microservices and Cloud-native Architectures Are Increasingly the Preferred Way to Deliver Production Apps

ESG's research indicates that a majority of organizations are making significant progress on their application modernization journeys, with nearly three-quarters (73%) currently developing cloud-native applications based on microservices architectures. While usage may be relatively limited at this point, almost two-thirds (65%) of organizations expect more than half of their production applications to be based on a microservices, cloud-native architecture within two years.
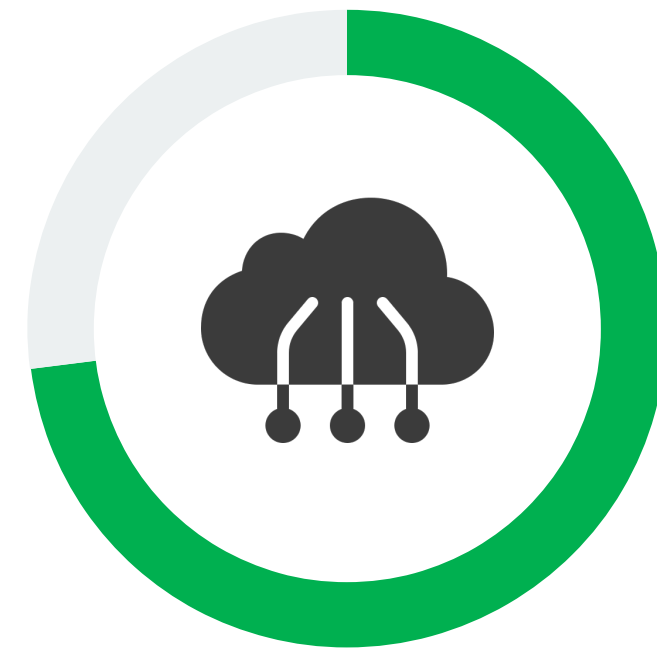
73%
are currently developing cloud-native applications based on microservices architectures.

| Percentage of production applications based on a microservices, cloud-native architecture.

■ Today (N=281)　　■ 24 months from now (N=387)

	25% or less	26% to 50%	51% to 74%	75% or more	Don't know
Today	14%	47%	32%	7%	0%
24 months from now	7%	27%	35%	30%	1%
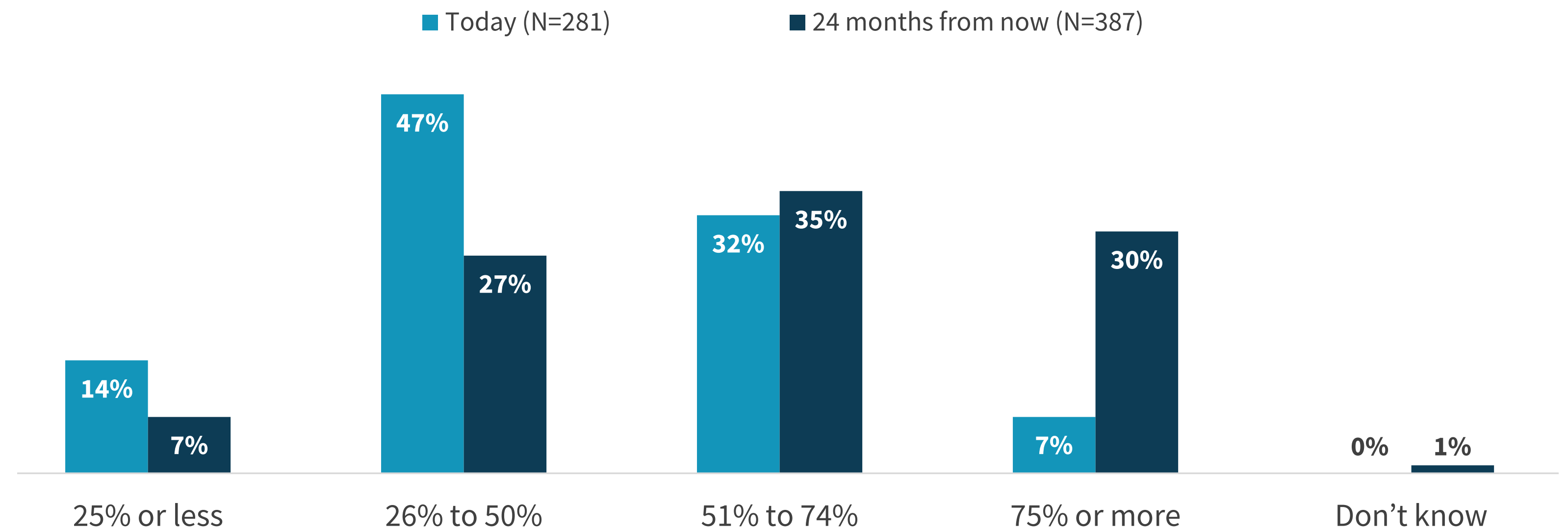
Public Cloud-based Applications Are Pervasive, with Many Employing Multi-cloud Strategies

Nearly nine in ten organizations currently deploy production applications and server workloads on public cloud infrastructure and/ or platform services. However, the vast majority of organizations are leveraging more than one unique public cloud infrastructure service provider. Indeed, 42% report using at least four CSPs, which is not surprising given the importance of a distributed or multi-cloud approach to cloud-native strategies.

Nearly nine in ten
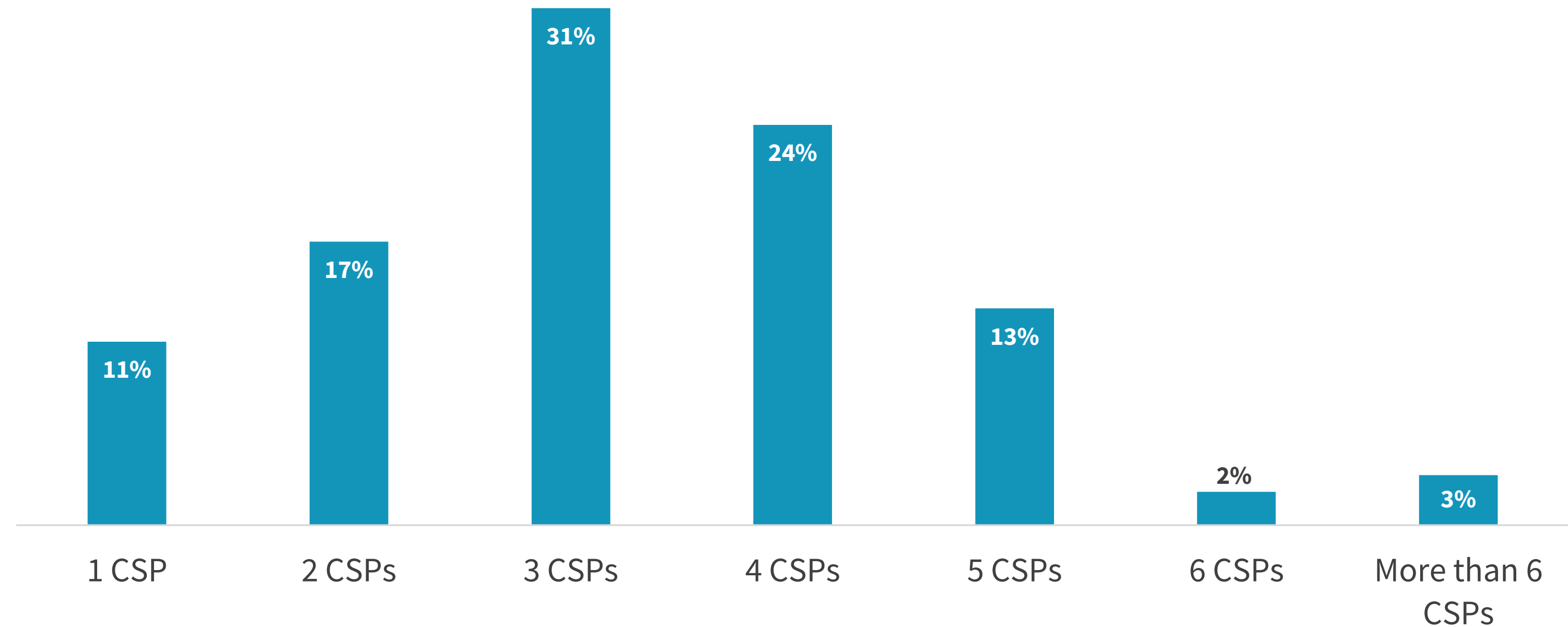organizations currently deploy production applications and server workloads on public cloud infrastructure and/or platform services.

| Number of unique public cloud infrastructure service providers (IaaS and/or PaaS) currently used.

11%	17%	31%	24%	13%	2%	3%
1 CSP	2 CSPs	3 CSPs	4 CSPs	5 CSPs	6 CSPs	More than 6 CSPs

Portability of Cloud-native Apps Is an Important Factor, Especially for Organizations with Hybrid Strategies
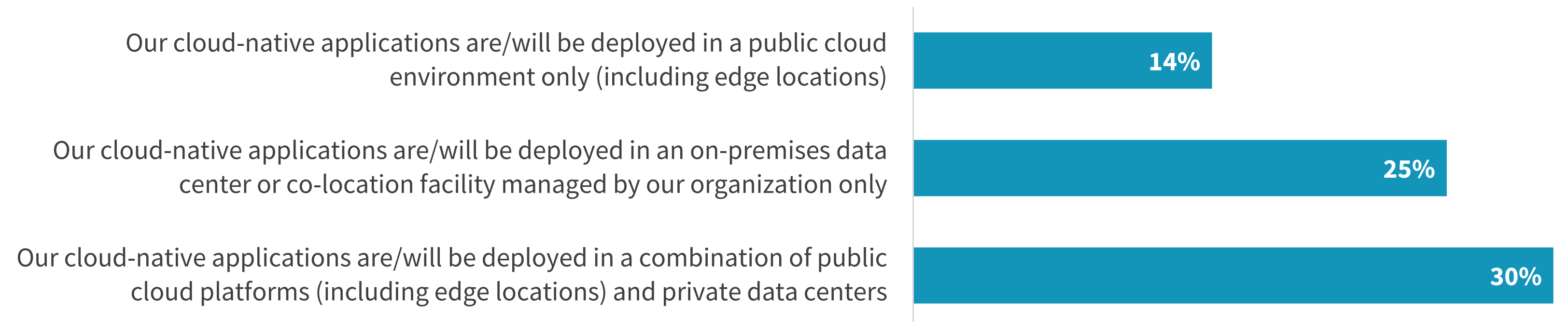
Organizations were asked about the importance of application portability, including the ability to move from data centers to edge locations and cloud services, cloud to cloud, etc. The vast majority of respondents indicated that it is either critical (19%) or very important (67%). Those organizations taking a hybrid approach to their cloud-native application deployments were more than twice as likely (30% versus 14%) to consider application portability critical compared to their counterparts taking a purely public cloud position on deploying cloud-native applications.

| Importance of application portability.

Somewhat important, 12%

Not important, 1%

Critical, 19%
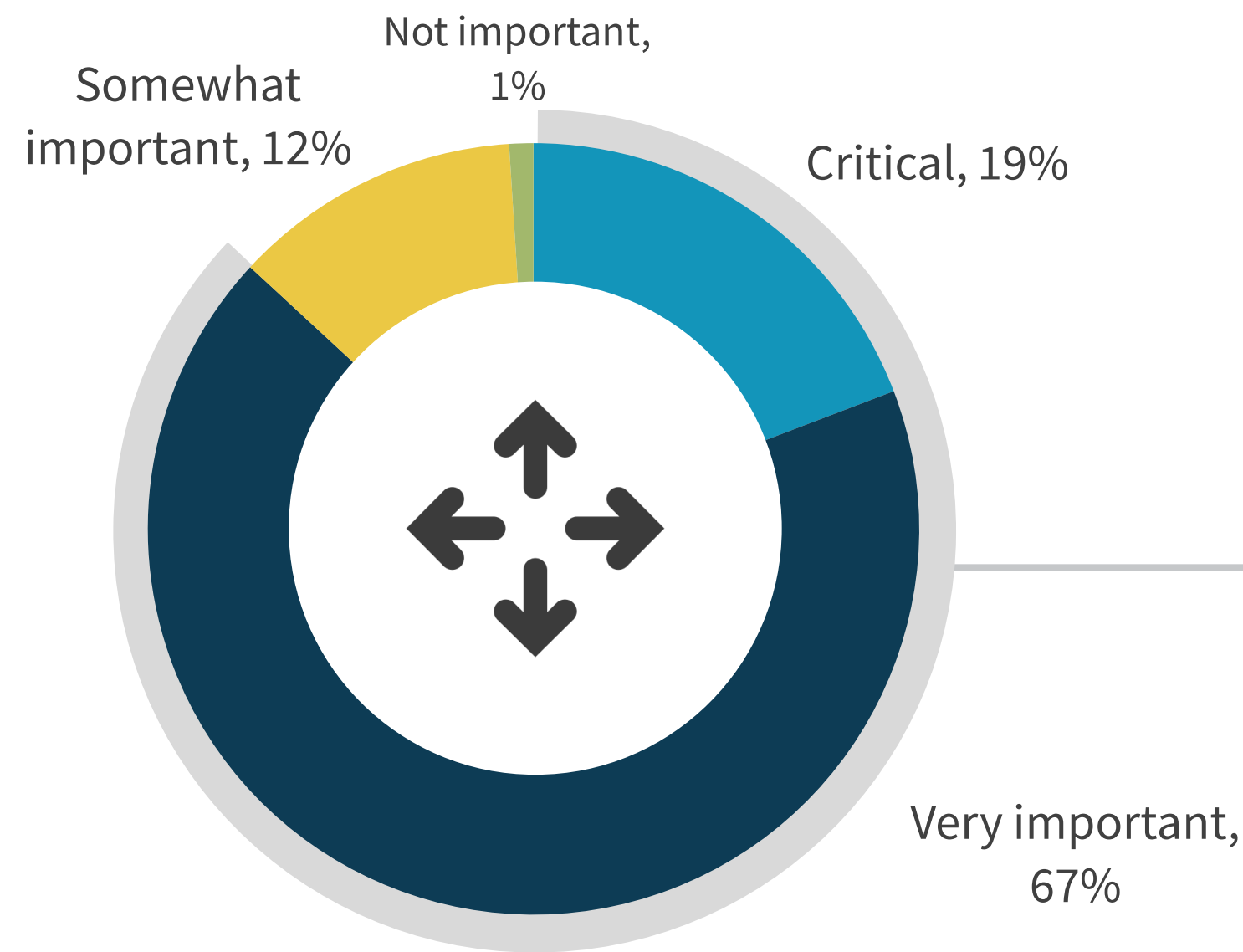
Very important, 67%

The vast majority of respondents indicate that application portability is either critical or very important."

| Percentage of organizations that consider application portability to be *critical* based on their current cloud-native environment.

Our cloud-native applications are/will be deployed in a public cloud environment only (including edge locations) — **14%**

Our cloud-native applications are/will be deployed in an on-premises data center or co-location facility managed by our organization only — **25%**

Our cloud-native applications are/will be deployed in a combination of public cloud platforms (including edge locations) and private data centers — **30%**

IT Recognizes the Value of
Modern Application Architectures,
but Challenges Persist

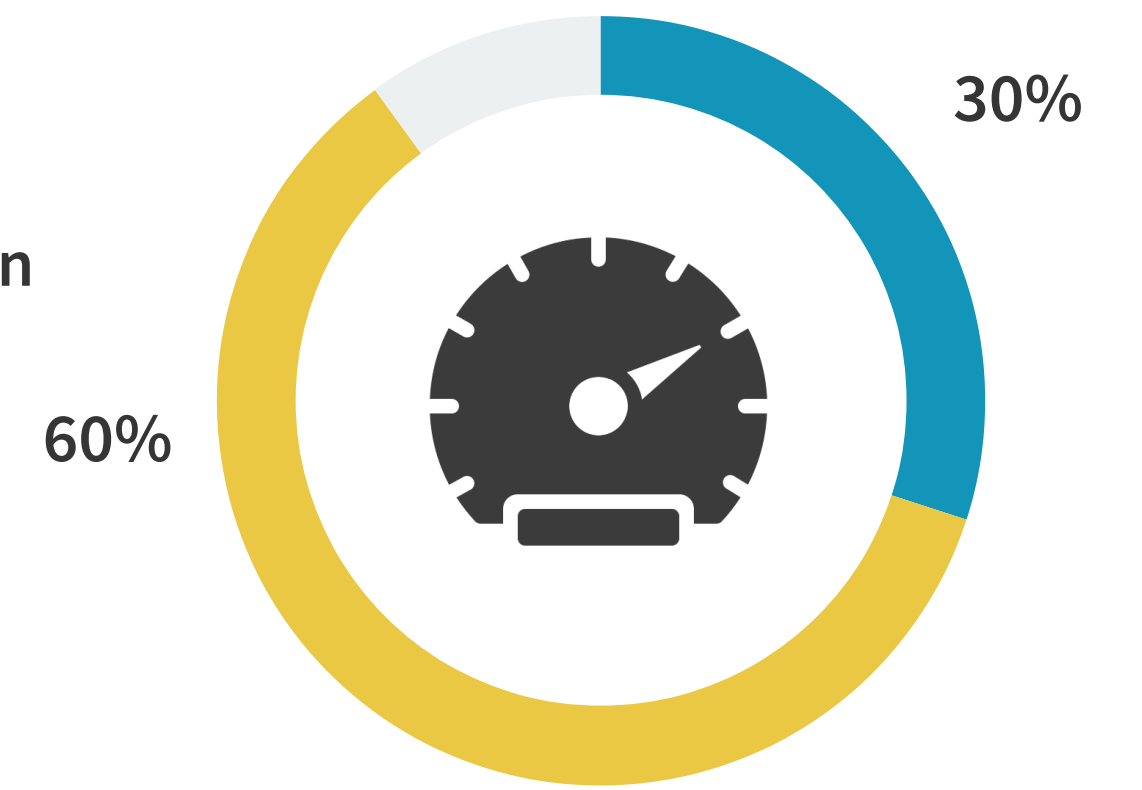## Cloud-native Application Deployment and Delivery Provide a Faster Time to Value than Traditional Apps

Organizations are reaping the benefits of adopting cloud-native application strategies. In fact, 90% of organizations indicate that moving cloud-native workloads from one public cloud to another or to on-premises infrastructure is a faster process compared to traditional application deployments, and nearly a third say this process is significantly faster with cloud-native architectures. Additionally, more than half of respondents indicated that cloud-native application development has had a very positive impact across several key areas, including deployment efficiency (57%), earlier error identification (56%), and code review efficiency (55%).

?

How much faster
is the process of changing where a cloud-native application is run compared to traditional applications?

30%

60%

■ Significantly faster   ■ Faster

| Areas in which cloud-native application development has had a very positive impact.

Efficiency in package deployment — **57%**

Ability to identify errors earlier in the software development lifecycle — **56%**

Efficiency in code review and collaboration cycles — **55%**

Speed of development — **53%**

Efficiency in onboarding new team members — **53%**

Efficiency during schema deployment — **52%**
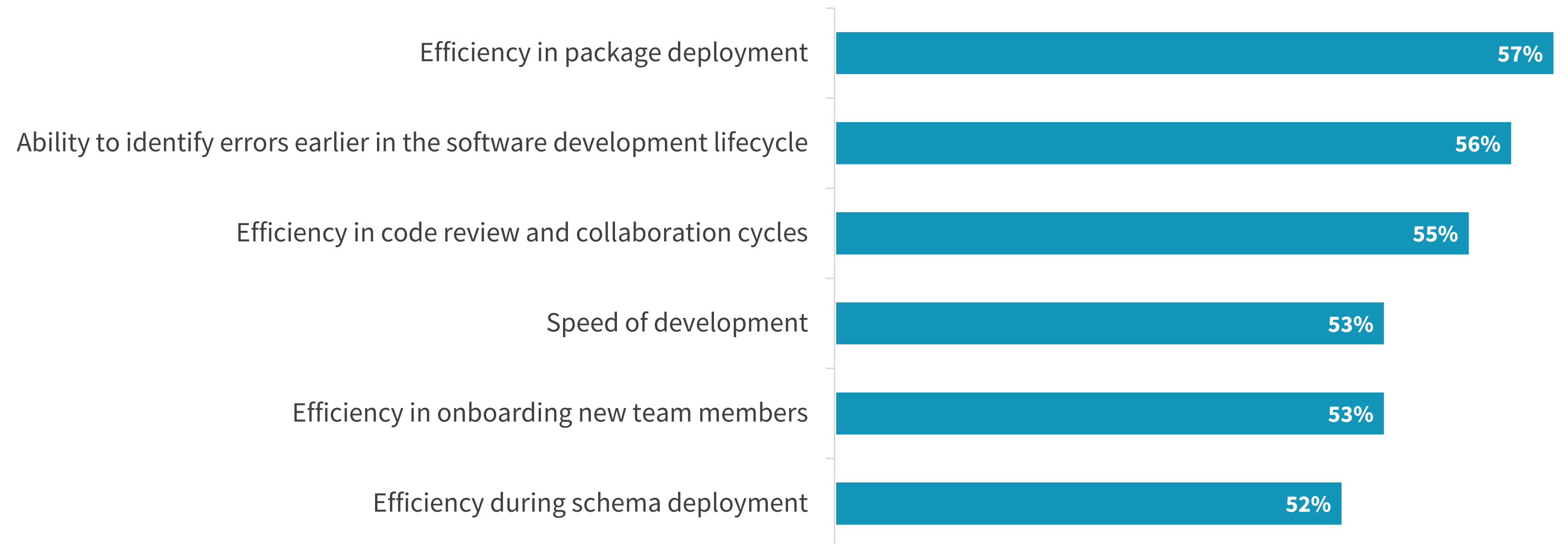
More than one-third

of respondents indicate that **security** is one of the biggest challenges their organization has faced or expects to face with its cloud-native applications.

Security, Compliance, and Observability Most Common Cloud-native Application Challenges

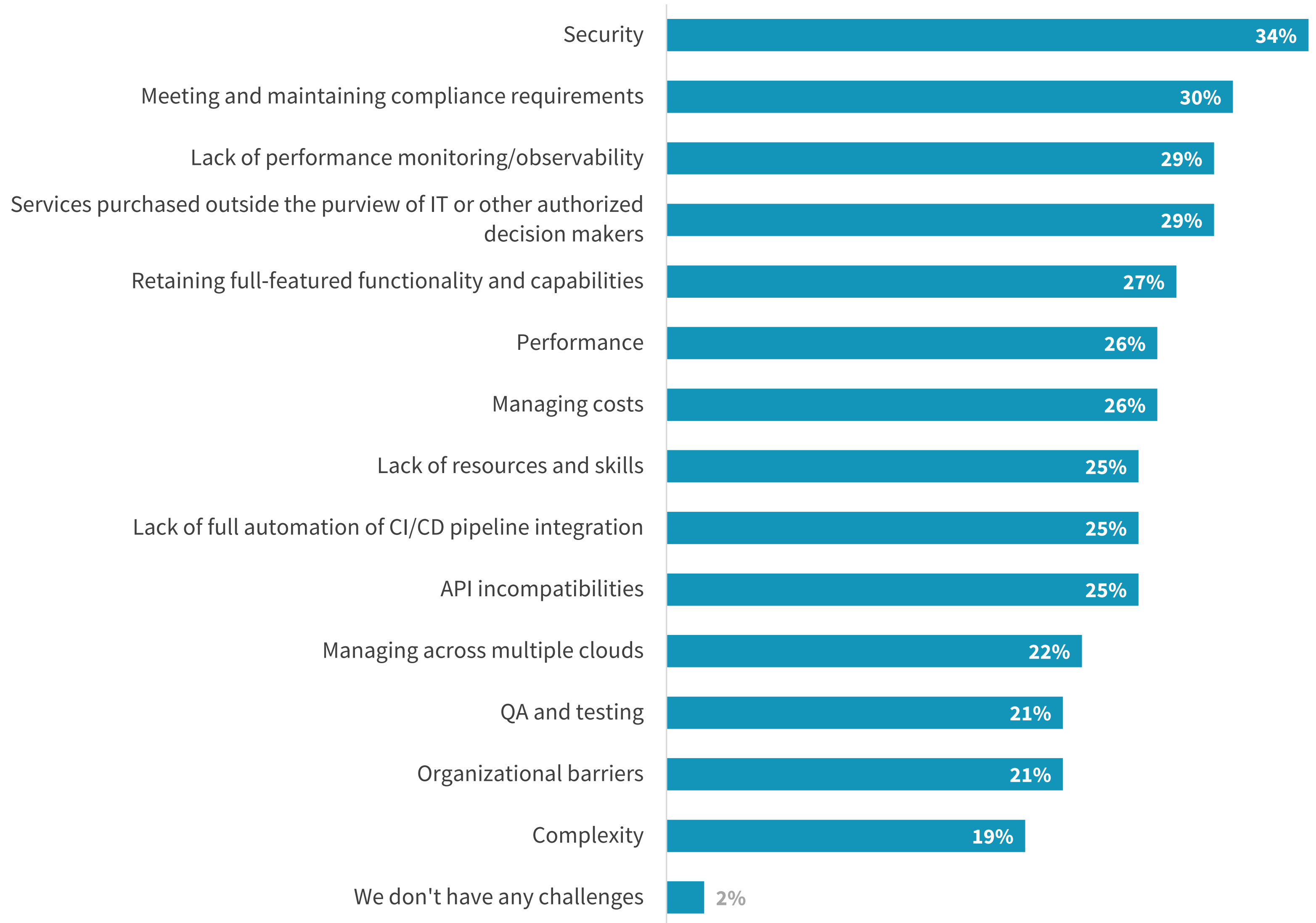Despite the benefits realized, organizations do report encountering a variety of challenges with cloud-native approaches. More than one-third (34%) of respondents indicate that security is one of the biggest challenges their organization has faced or expects to face with its cloud-native applications. But that is not the only area where organizations are encountering issues when it comes to cloud-native application deployment. Other common shortcomings cited include meeting compliance requirements, a lack of performance monitoring, and shadow IT tendencies in the form of groups purchasing cloud services autonomously.

| Biggest challenges with cloud-native applications

Challenge	Percent
Security	34%
Meeting and maintaining compliance requirements	30%
Lack of performance monitoring/observability	29%
Services purchased outside the purview of IT or other authorized decision makers	29%
Retaining full-featured functionality and capabilities	27%
Performance	26%
Managing costs	26%
Lack of resources and skills	25%
Lack of full automation of CI/CD pipeline integration	25%
API incompatibilities	25%
Managing across multiple clouds	22%
QA and testing	21%
Organizational barriers	21%
Complexity	19%
We don't have any challenges	2%

The Path to Cloud-native Is Modern Application Platforms

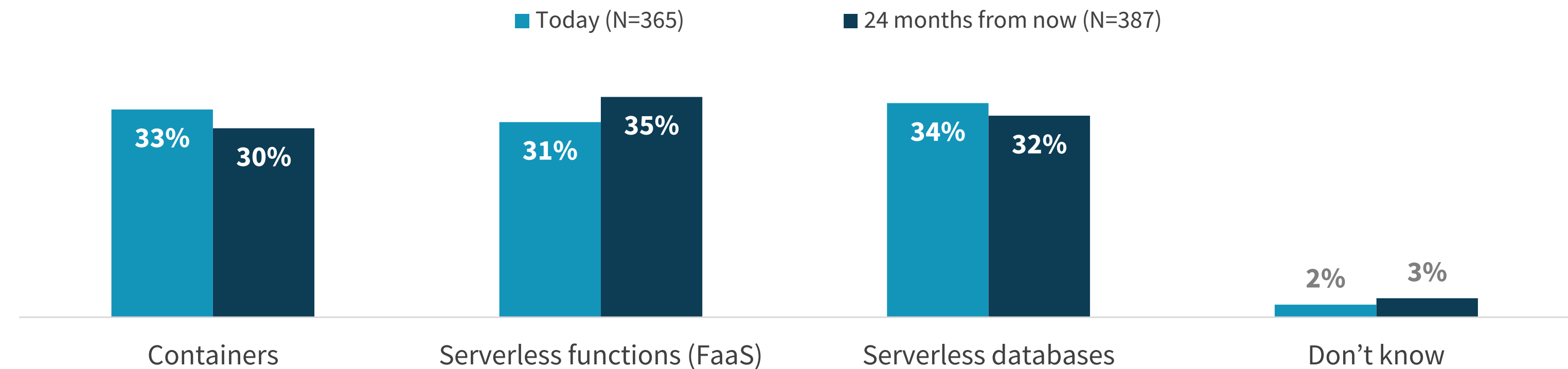# When Deploying Cloud-native Apps, the Platform Matters

The importance of providing "developer-ready" infrastructure is key to most organizations deploying cloud-native applications, with more than one in five categorizing it as critical. In terms of the underlying platforms, organizations are evenly split between containers, FaaS, and serverless as far as the primary approach to supporting cloud-native application deployment. This split is not expected to change much over the next two years, suggesting particular platforms may just work better in certain types of environments with specific cloud-native applications and workloads.

| Importance of "developer-ready" infrastructure.

Somewhat important, 10%

Critical, 22%

Very important, 67%
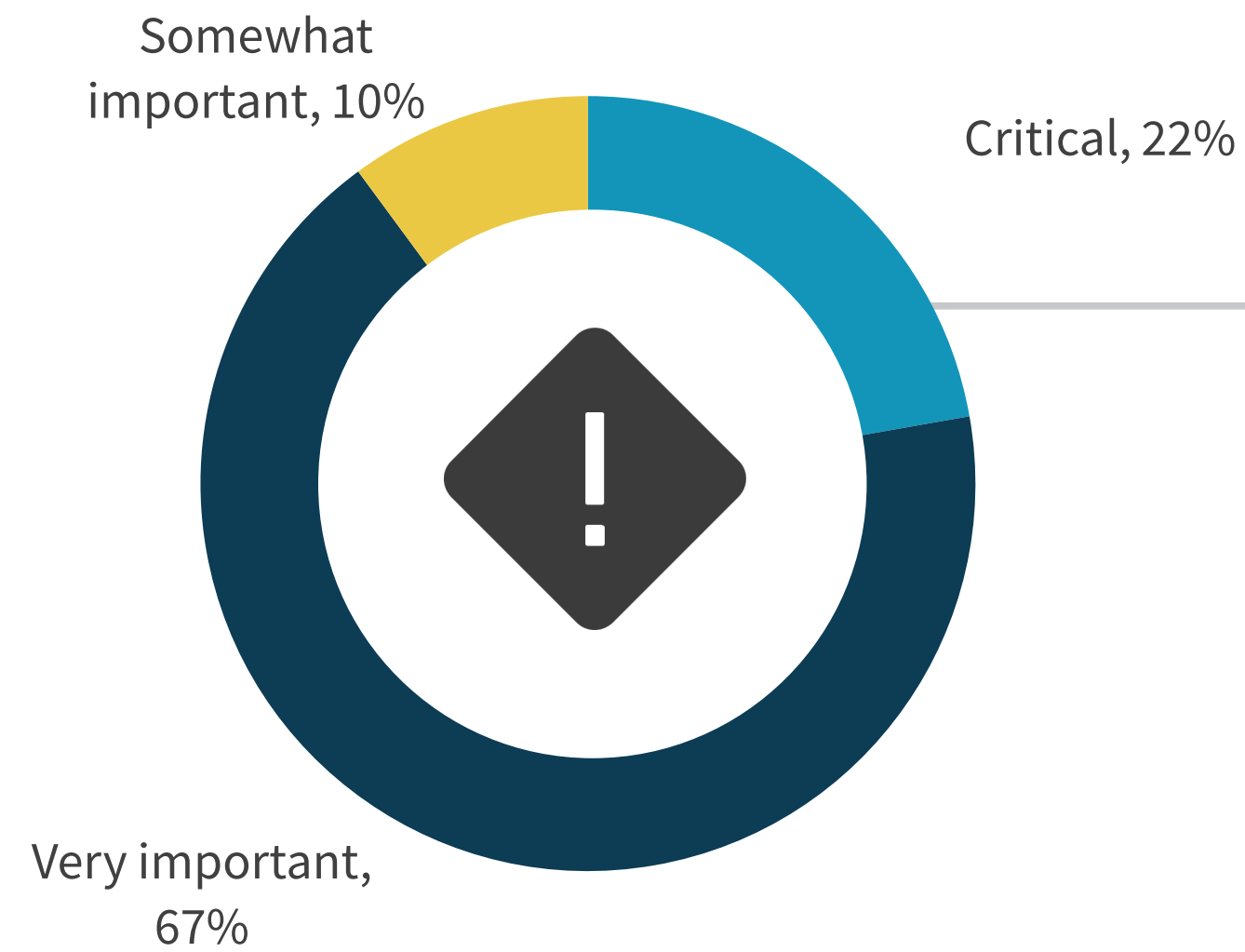
"More than 1 in 5 categorize 'developer-ready' infrastructure as critical."

| **Primary** infrastructure technology used for cloud-native applications.

■ Today (N=365)   ■ 24 months from now (N=387)

	Containers	Serverless functions (FaaS)	Serverless databases	Don't know
Today	33%	31%	34%	2%
24 months from now	30%	35%	32%	3%

Scaling IaC Implementations Leads to Quality and Consistency Issues among Early Users

Organizations currently utilizing infrastructure-as-code (IaC) templates as part of their approach to cloud-native application development had a high response, with 62% of respondents indicating they use IaC extensively or in a limited fashion. But when it comes to issues that organizations are experiencing scaling their IaC implementations, more than half of these respondents indicate they struggle to ensure quality and consistency across teams (57%) and/or safely make changes to infrastructure (56%).
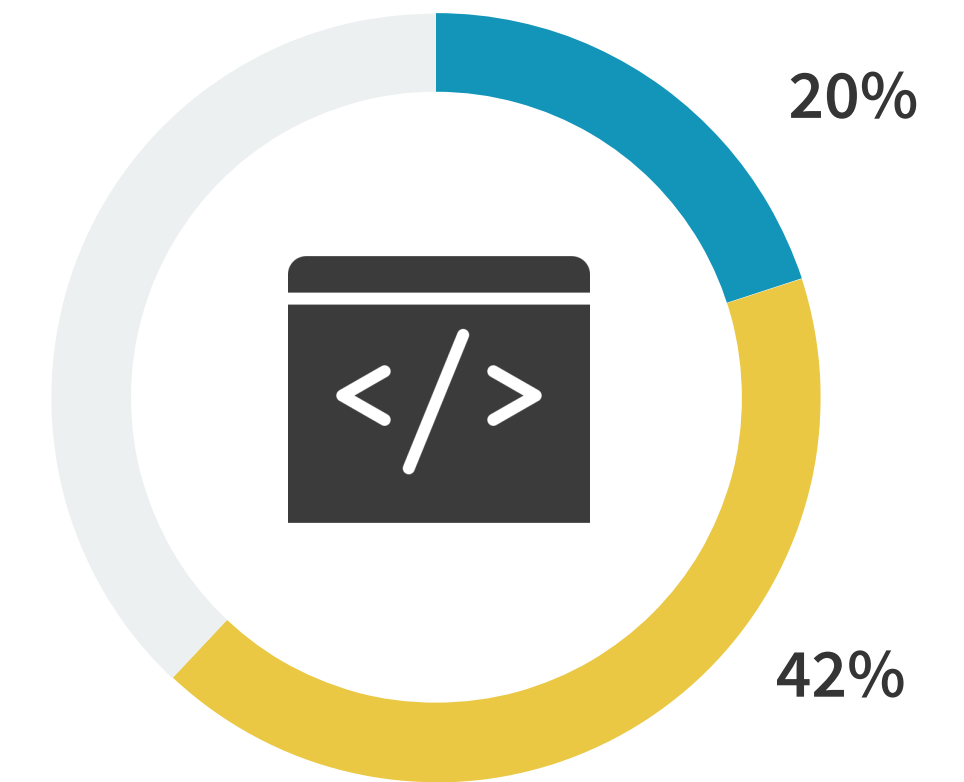
62% of respondents
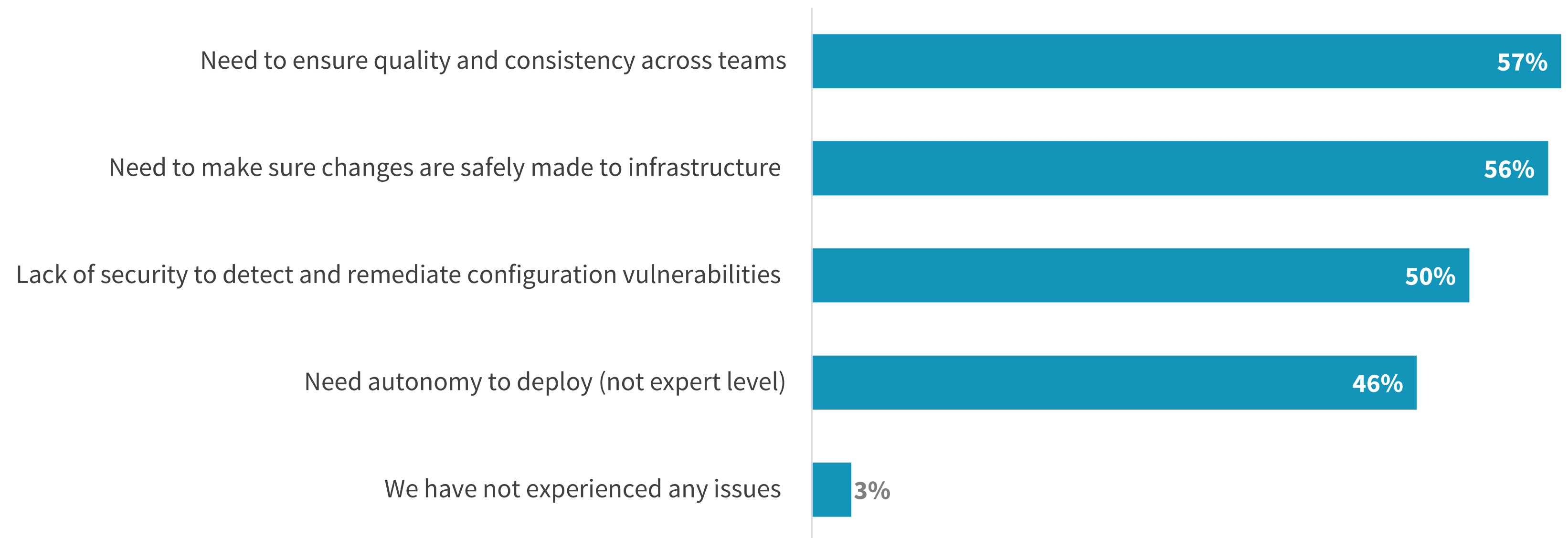indicate they use IaC extensively or in a limited fashion.

Use of infrastructure-as-code (IaC).

■ Yes, we use IaC extensively

■ Yes, we use IaC in a limited fashion

20%

42%

| Issues scaling infrastructure-as-code (IaC) implementations. |

Issue	Percentage
Need to ensure quality and consistency across teams	57%
Need to make sure changes are safely made to infrastructure	56%
Lack of security to detect and remediate configuration vulnerabilities	50%
Need autonomy to deploy (not expert level)	46%
We have not experienced any issues	3%

The Cloud-native Transition Is Dependent on Iterative Methodologies
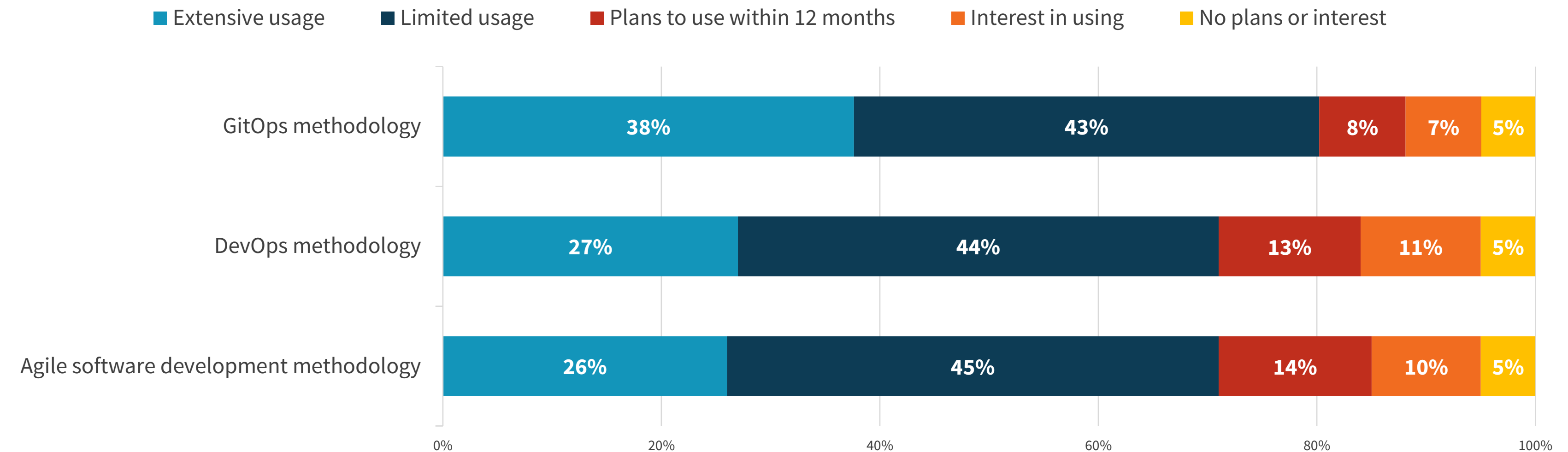
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More than one-third

report extensive use of GitOps, and more than **one-quarter** classify their usage of DevOps and agile similarly.

Broad Usage of DevOps, Agile Software Development, and GitOps Methodologies

Many organizations are also modernizing their approach to application development in an increasingly cloud-centric and cloud-native landscape. Indeed, the majority of organizations are leveraging the GitOps, DevOps, and agile software development methodologies in some capacity, with more than one-third (38%) reporting extensive use of GitOps and more than one-quarter classifying their usage of DevOps and agile similarly.

> **Many organizations are also modernizing their approach to application development** in an increasingly cloud-centric and cloud-native landscape.**"**
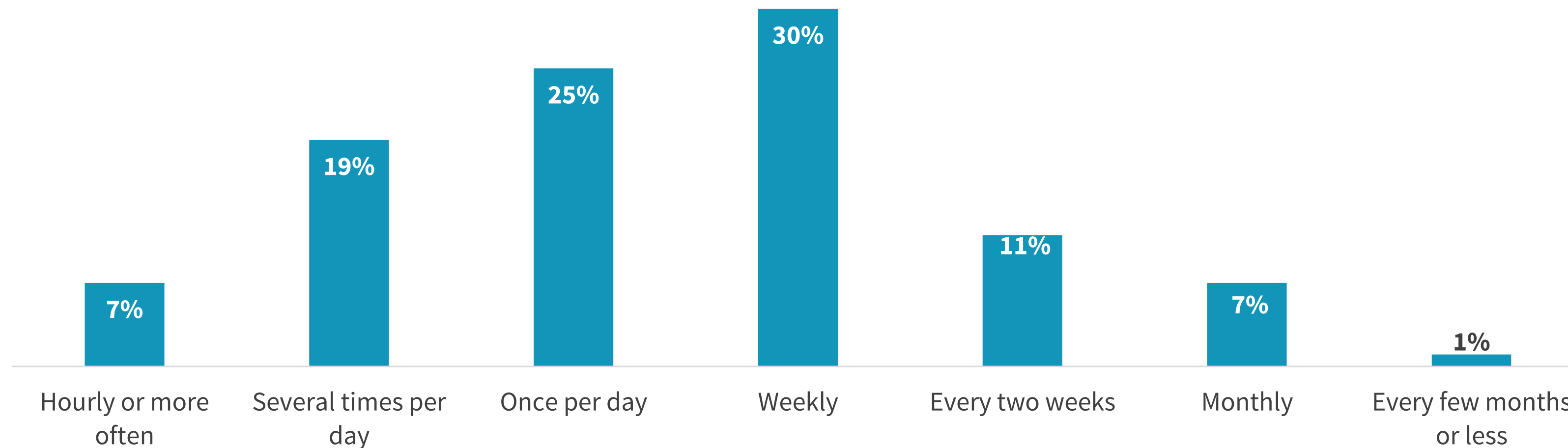
| Usage of DevOps, agile software development, and/or GitOps methodologies.

Legend: ■ Extensive usage ■ Limited usage ■ Plans to use within 12 months ■ Interest in using ■ No plans or interest

Methodology	Extensive usage	Limited usage	Plans to use within 12 months	Interest in using	No plans or interest
GitOps methodology	38%	43%	8%	7%	5%
DevOps methodology	27%	44%	13%	11%	5%
Agile software development methodology	26%	45%	14%	10%	5%

Most Can Deploy New Code to Production on a Daily Basis…

Many organizations view themselves as mature when it comes to delivering new code. Specifically, more than half (51%) can typically deploy new code to production on a daily basis, with 7% indicating the ability to do so hourly. This increases noticeably among those organizations using iterative methodologies like GitOps, DevOps, and agile in an extensive manner. Compared to their peer organizations, those extensive users of GitOps, DevOps, and agile were significantly more likely to deploy new code hourly.

| Frequency with which organizations typically deploy new code to any production environment.

Hourly or more often: 7%
Several times per day: 19%
Once per day: 25%
Weekly: 30%
Every two weeks: 11%
Monthly: 7%
Every few months or less: 1%

…but Those Using Iterative Methodologies *Extensively* Are Much Likelier to Do So *Hourly*

GitOps:
- Using extensively: **22%**
- All other organizations: **3%**

DevOps:
- Using extensively: **21%**
- All other organizations: **2%**

Agile development:
- Using extensively: **13%**
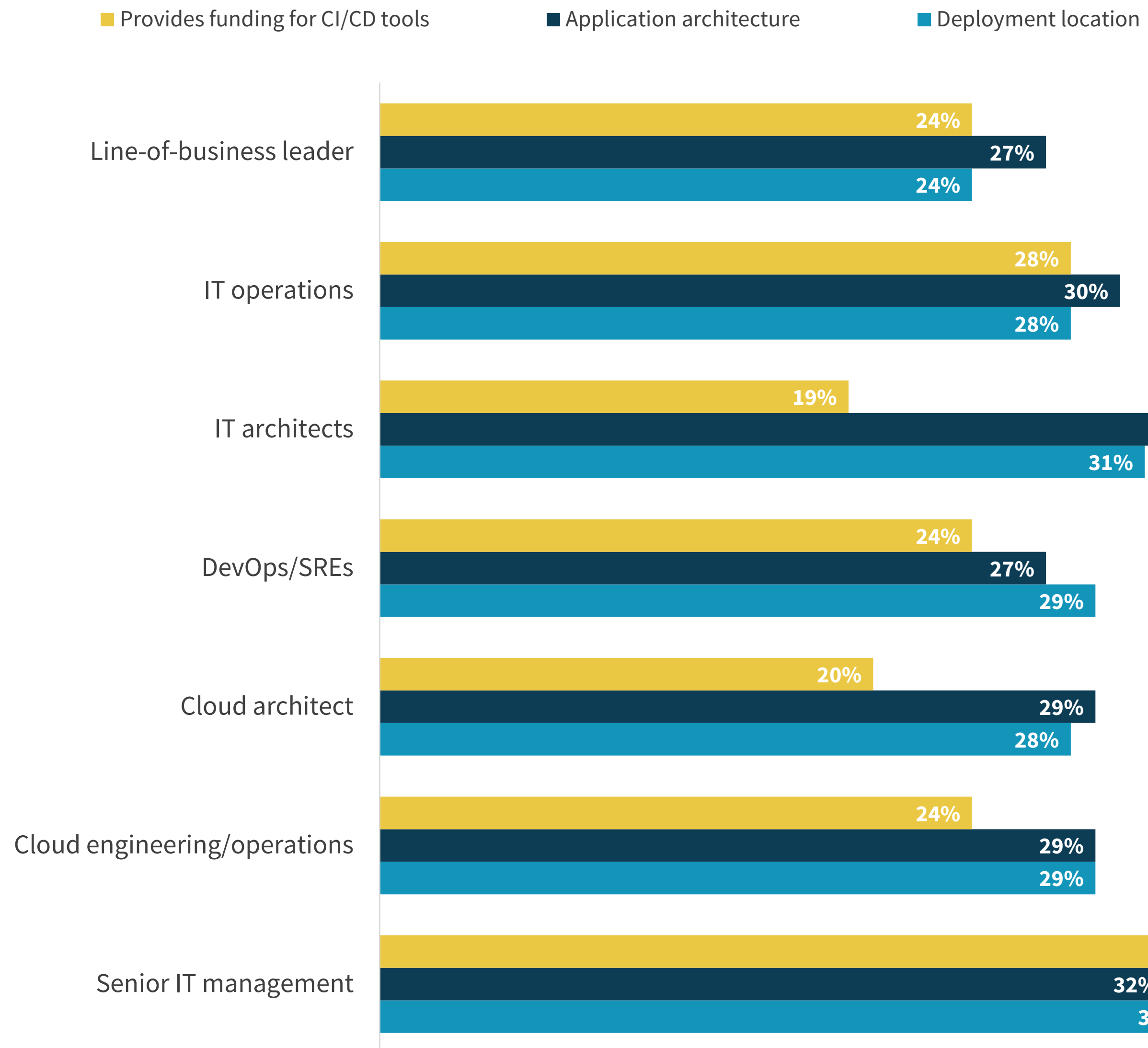- All other organizations: **6%**

Organizational Dynamics Align to Cloud-native Success

It Takes a Village to Formulate and Execute on Cloud-native App Strategies

Multiple groups have an impact and influence on various decisions pertaining to cloud-native application strategies. Specifically, selecting the deployment location as well as the underlying application architecture relies on a cross-functional team approach. When it comes to the budgets to pay for cloud-native application strategies, these decisions are more commonly influenced by senior IT management and IT operations.

| Individuals or groups that have the most influence on decisions involving cloud-native applications.

Legend: ■ Provides funding for CI/CD tools   ■ Application architecture   ■ Deployment location

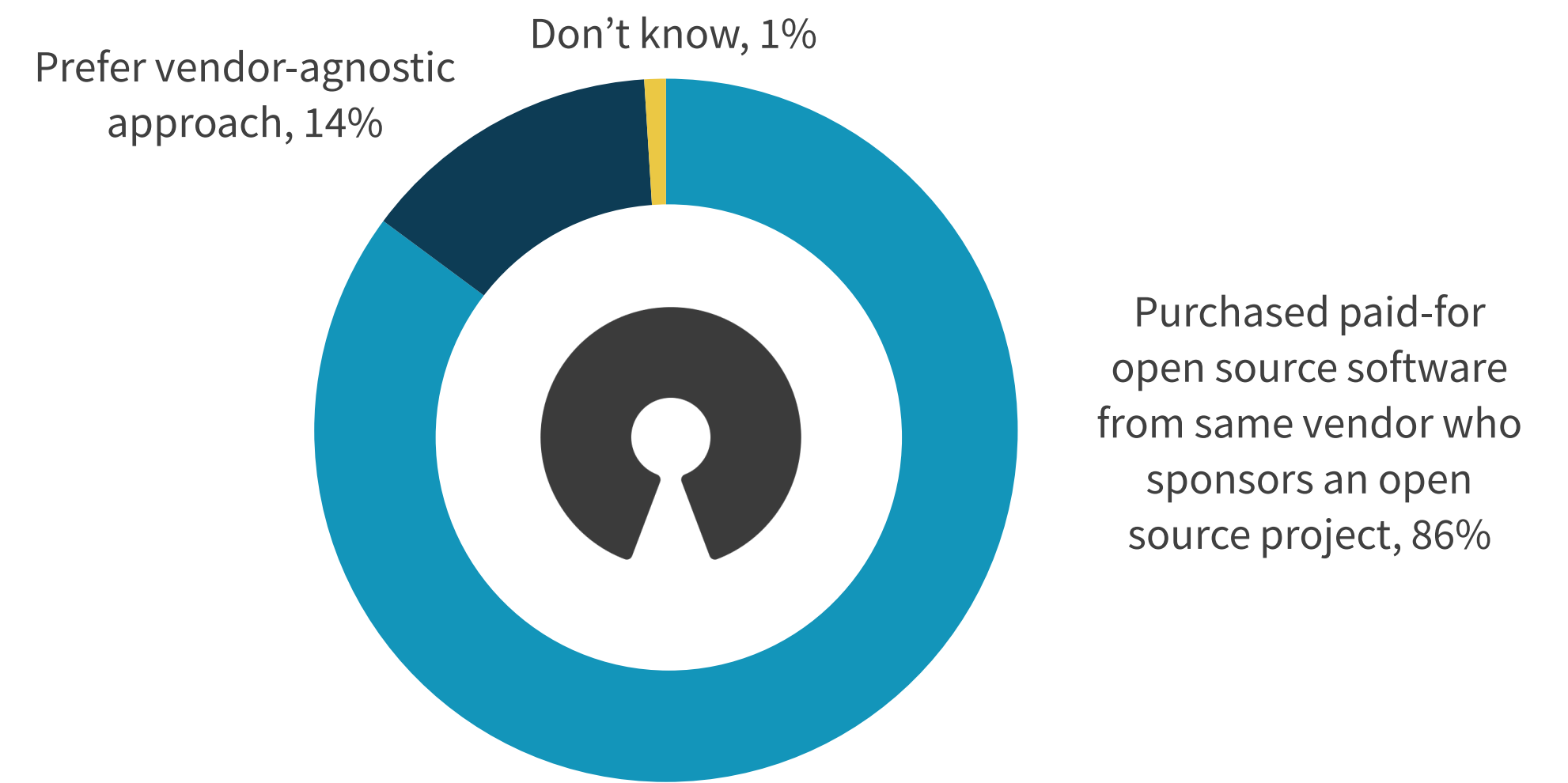| Group	Provides funding for CI/CD tools	Application architecture	Deployment location
Line-of-business leader	24%	27%	24%
IT operations	28%	30%	28%
IT architects	19%	35%	31%
DevOps/SREs	24%	27%	29%
Cloud architect	20%	29%	28%
Cloud engineering/operations	24%	29%	29%
Senior IT management	35%	32%	33%

Cloud-native Support Does Influence Vendor Purchase Decisions

Paid enterprise-level support is the preferred method when it comes to organizations' cloud-native ecosystems. But even among organizations that use non-paid open source software to some extent, nearly nine in ten of these respondents indicated that they were influenced to purchase an enterprise agreement based on a vendor's participation in an open source project.
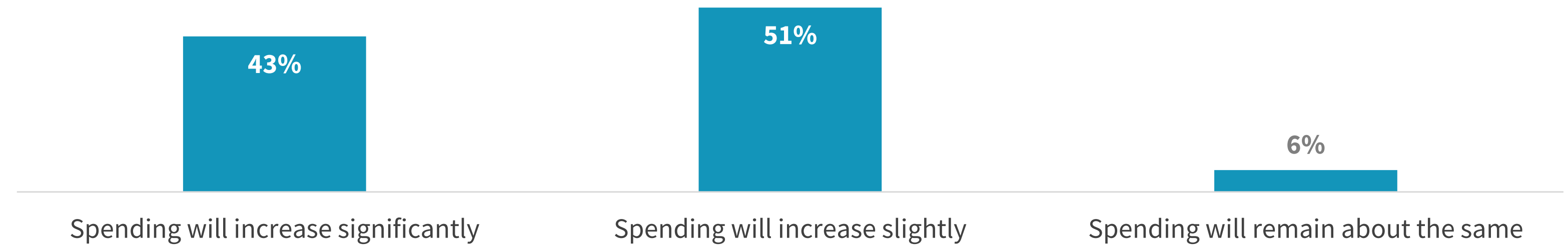
| Approach to cloud-native application support.
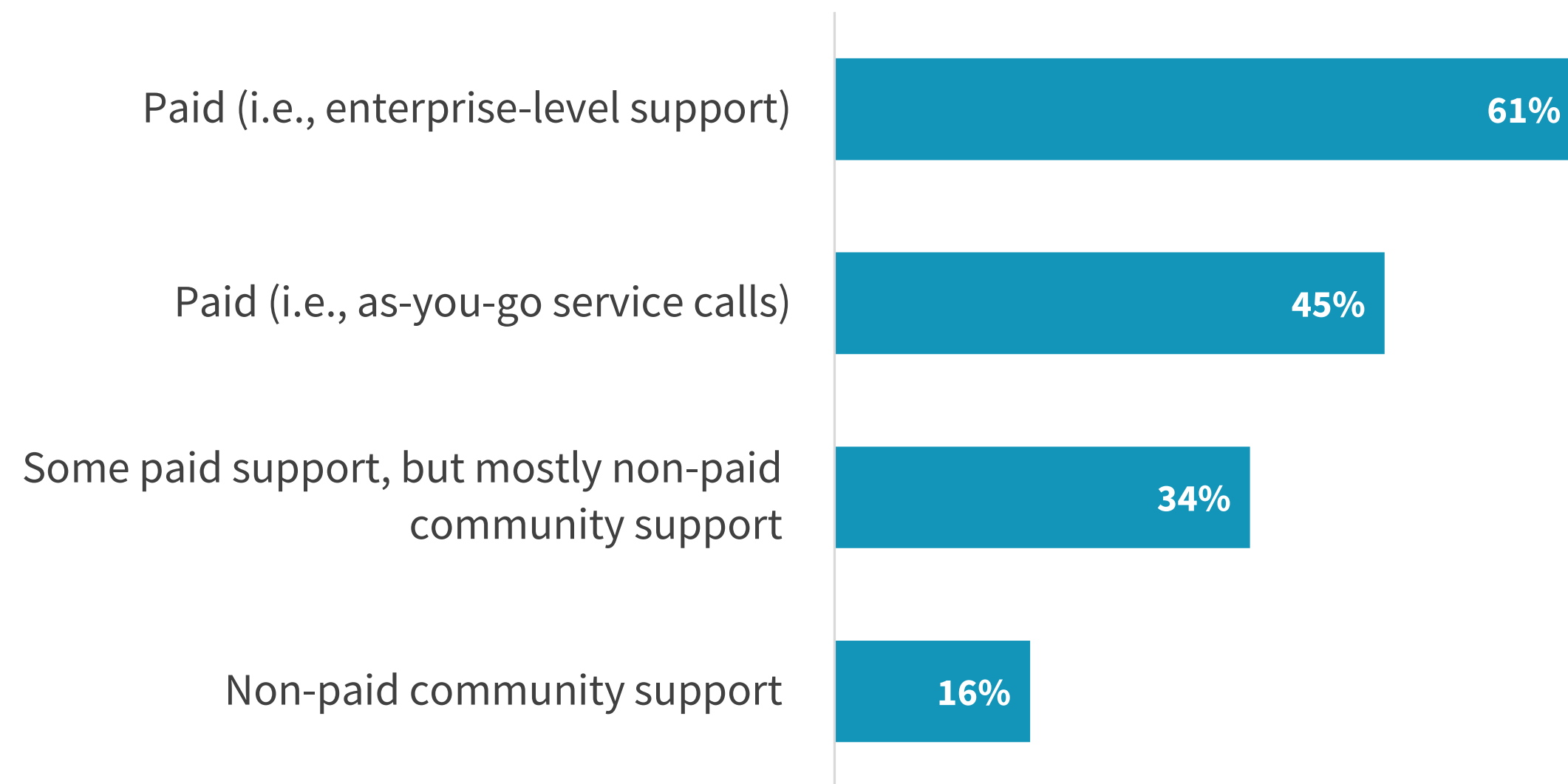
Influence of non-paid open source software on decision to purchase an enterprise agreement.

Paid (i.e., enterprise-level support) — 61%

Paid (i.e., as-you-go service calls) — 45%

Some paid support, but mostly non-paid community support — 34%

Non-paid community support — 16%

Don't know, 1%

Prefer vendor-agnostic approach, 14%

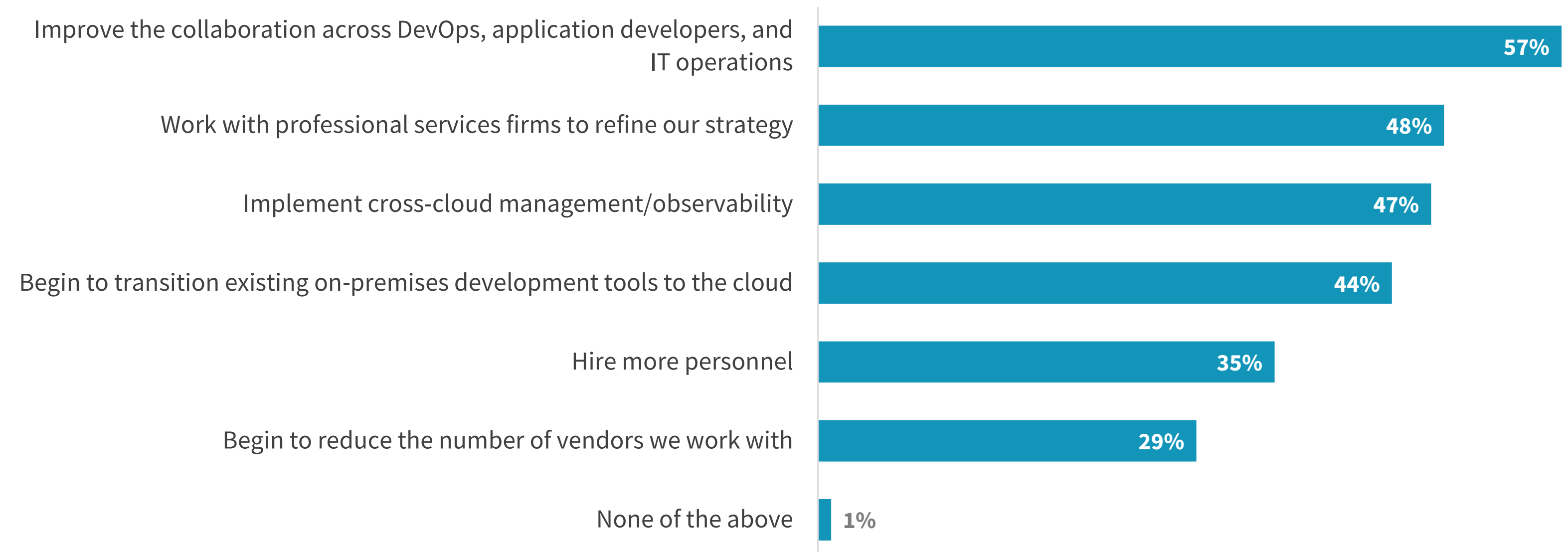Purchased paid-for open source software from same vendor who sponsors an open source project, 86%

Vast Majority Will Increase Cloud-native Spending, and Most Strive to Drive Increased Cross-team Collaboration

Many organization plan to increase spending on technologies, services, and personnel supporting cloud-native application development over the next 12-18 months. This is largely due to the objective of improving the collaboration across DevOps, application development, and IT operations teams, with more than half (57%) of respondents citing this as an action to optimize cloud-native application development strategies.

Spending plans for cloud-native application development over the next 12-18 months.

Spending will increase significantly	Spending will increase slightly	Spending will remain about the same
43%	51%	6%

Actions expected to be taken over the next 12-18 months to optimize cloud-native application development strategies.

| Action	Percentage
Improve the collaboration across DevOps, application developers, and IT operations	57%
Work with professional services firms to refine our strategy	48%
Implement cross-cloud management/observability	47%
Begin to transition existing on-premises development tools to the cloud	44%
Hire more personnel	35%
Begin to reduce the number of vendors we work with	29%
None of the above	1%

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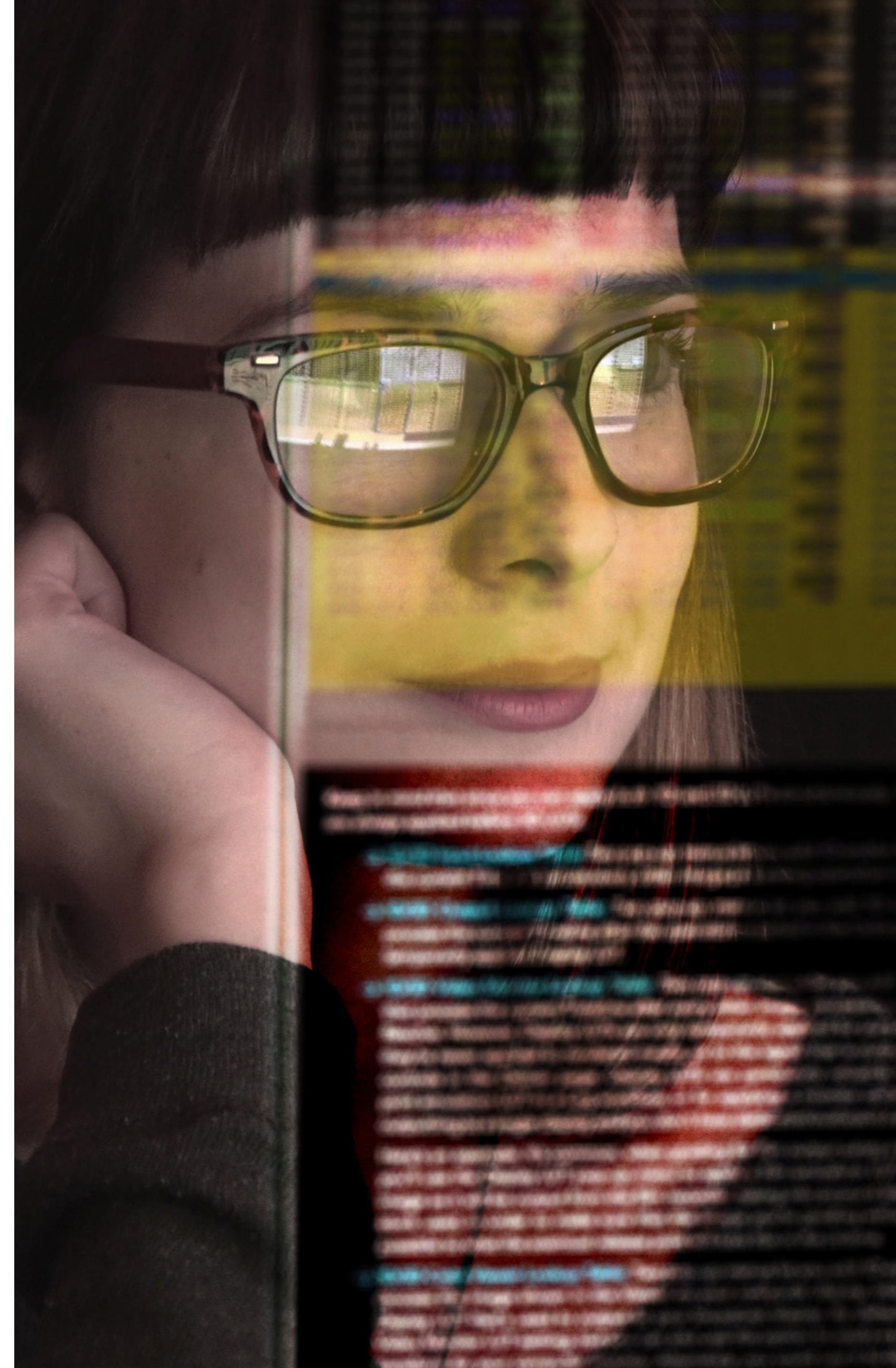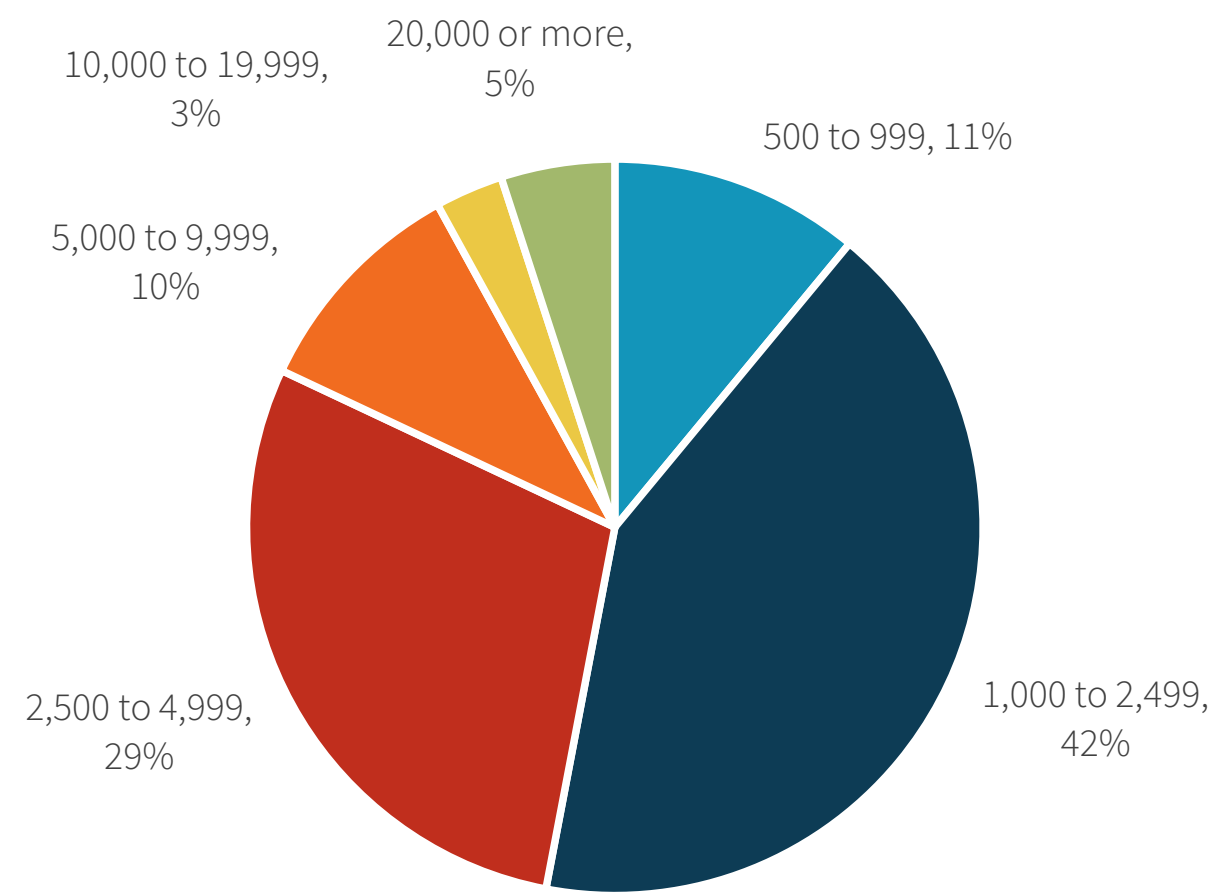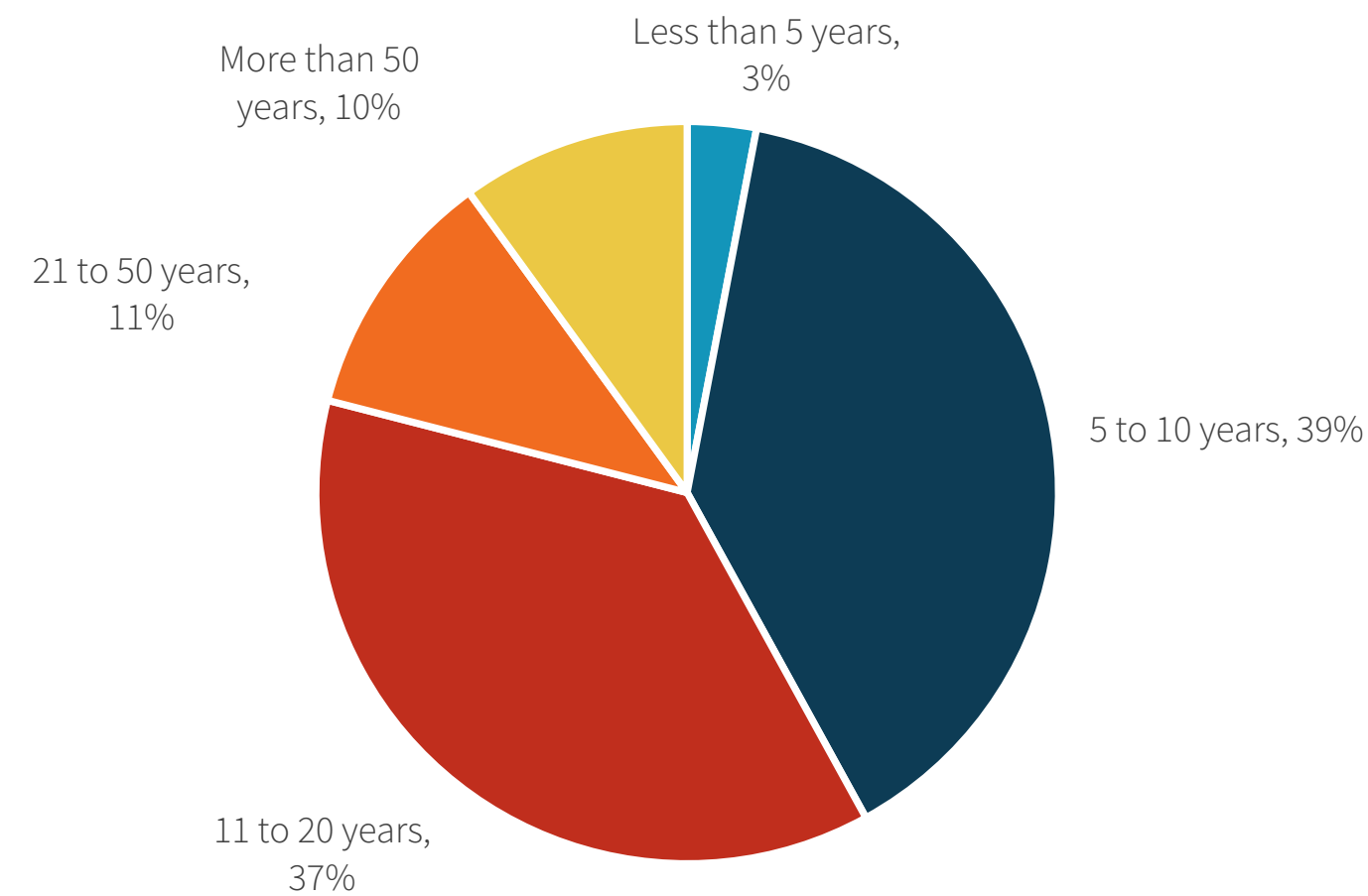
Research Methodology and Demographics

To gather data for this report, ESG conducted a comprehensive online survey of IT professionals from private- and public-sector organizations in North America (United States and Canada) between December 6, 2021 and December 17, 2021. To qualify for this survey, respondents were required to be IT professionals personally responsible for evaluating, purchasing, managing, and building application infrastructure. All respondents were provided an incentive to complete the survey in the form of cash awards and/or cash equivalents.

After filtering out unqualified respondents, removing duplicate responses, and screening the remaining completed responses (on a number of criteria) for data integrity, we were left with a final total sample of 387 IT professionals.

RESPONDENTS BY NUMBER OF EMPLOYEES

- 500 to 999, 11%
- 1,000 to 2,499, 42%
- 2,500 to 4,999, 29%
- 5,000 to 9,999, 10%
- 10,000 to 19,999, 3%
- 20,000 or more, 5%

RESPONDENTS BY AGE OF ORGANIZATION

- Less than 5 years, 3%
- 5 to 10 years, 39%
- 11 to 20 years, 37%
- 21 to 50 years, 11%
- More than 50 years, 10%

RESPONDENTS BY INDUSTRY

- Technology, 26%
- Manufacturing, 23%
- Financial, 13%
- Retail/wholesale, 11%
- Healthcare, 7%
- Communications and media, 4%
- Business services, 3%
- Government, 3%
- Other, 11%

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