The State of Cloud Native Application Platforms 2024

Presented by:

VMware Tanzu®

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Introduction

Over the last four years, we've published our annual *State of Kubernetes* report to understand the progress of organizations that are using Kubernetes in support of their cloud native strategies. During that time, there has been significant evolution in the cloud native ecosystem. With hastening tech cycles, a broader emphasis on application delivery, and deriving value from cloud native strategies, we expanded our research beyond Kubernetes, to a broader set of platforms and tools that support modern application development delivery. With this in mind, our annual *State of Kubernetes* report is now the *State of the Cloud Native Application Platforms*.

Our goals, however, remain largely the same:

- Understand how organizations of all types and sizes are building value by leveraging the cloud native ecosystem.
- Help our readers learn what their peers in the cloud native community are doing, how they are achieving success, where they are experiencing challenges, and what the future may hold.

We've continued to ask some of the same questions as in previous years so that we can understand and report on trends. We've also added new questions to dig deeper into how stakeholders are creating and using cloud native app platforms. We hope that these results and the report will allow us to expand our knowledge and yours.

One thing is clear: The value of cloud native is expanding beyond technical benefits, with 65% of stakeholders reporting one or more direct financial benefits. *Meeting security and governance requirements* has become the greatest management challenge, underscoring the growing importance of compliance and governance. Also of note, almost three-quarters (72%) of respondents are operating multiple application platforms, despite the increased complexity of doing so. This appears to be, in part, due to a diversity of apps that utilize different architectures and deployment patterns. At the same time, business leaders are seeking greater market responsiveness as measured by *deployment frequency*, *lead time for changes*, and *mean time to change production code*. Competing requirements for flexibility and repeatability need to be considered to avoid undercutting potential benefits.

This report is divided into four sections:

Delivering Value

Cloud native app platforms offer benefits beyond Kubernetes.

Mitigating Risks

Use cases increasingly focus on security and governance.

Supporting App Diversity

Varying application needs and types are driving platform proliferation.

Simplifying Patterns

Consistency and repeatability are critical to accelerate app deployment.

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Delivering Value

Stakeholders are seeing value from their cloud native strategies and realizing tangible business benefits. Almost two-thirds (65%) report seeing at least one direct financial benefit. For example, 26% reported that *new revenue-driving customer experiences have been created*, a gain of five percentage points since last year. Meanwhile, compliance, security, data integration and other challenges remain, contributing to friction in the application development and delivery process.

What are cloud native application platforms?

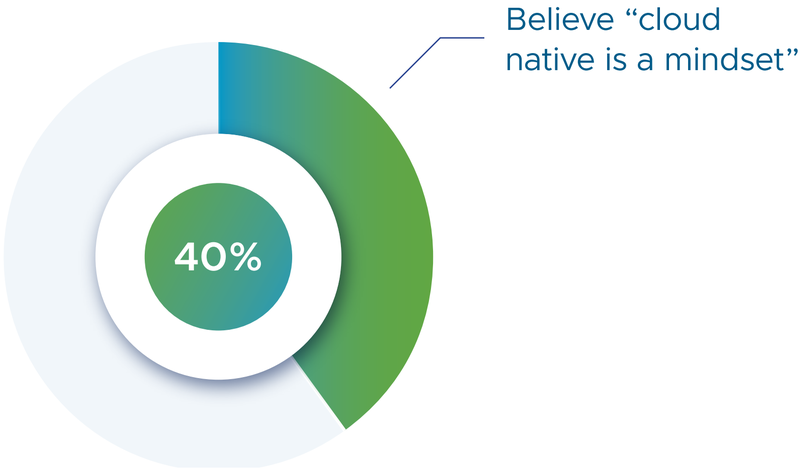
For the purposes of this survey, we defined *cloud native application platforms* as:

An integrated collection of capabilities that separates supporting resources (e.g., databases, message queues, user directories, etc.) from application-specific logic for cloud native architectures. A "cloud native app platform" provides enterprise teams (development, DevOps, platform engineering, etc.) access to resources in ways that make it easy to integrate applications and systems.

Source: Cloud Native Computing Foundation.

What does it mean to be cloud native?

Given the expansion of our research focus, we first wanted to understand what *"cloud native enterprise"* means to our stakeholders. Almost two-thirds (62%) chose *the type of application infrastructure technology*, and half (52%) chose *there is a DevOps/Platform Engineering function*. More surprising is that 40% believe *cloud native is a mindset*, perhaps indicating that cloud native has as much to do with a commitment to delivering modern applications as it does with adopting a particular technology or discipline.



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Across the board gains in business benefits

We also see substantial increases in specific business benefits. A greater number of stakeholders reported that *IT operators are more efficient* (70% versus 64%) and *our developers are more productive* (64% versus 60%).

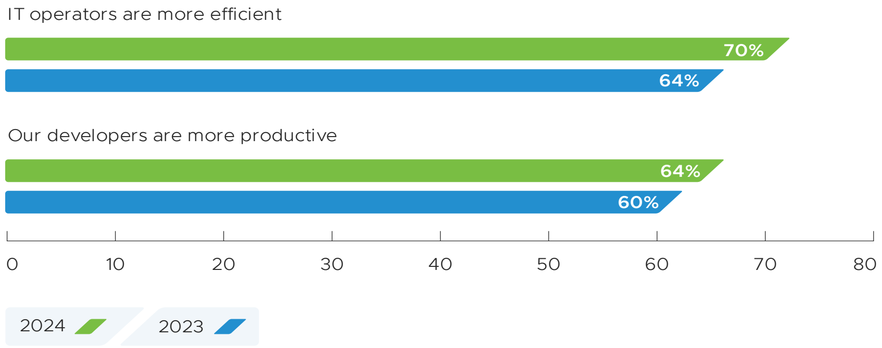
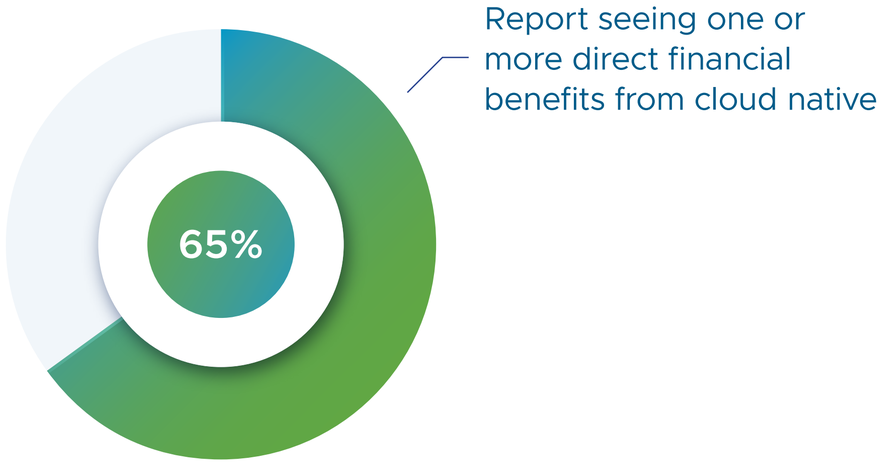


Figure 1: Business benefits.

Significant direct financial benefits

Two-thirds of respondents (65%) reported seeing one or more direct financial benefits from cloud native. *Budget or technology decision-makers* rate these benefits higher across the board than non-decision-makers. Notably, 43% of *decision-makers* said that cloud native *helps IT leadership show IT as a revenue driver*, 26% believe *the business is seeing growth in market share*, and 23% said that *profit margins are increasing*.



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Challenges persist

While the gains in business benefits are exciting, challenges still remain. *Meeting compliance and security requirements* (55%) and *integration with existing data sources and repositories* (53%) are the top challenges when building or adopting a cloud native application platform.

Room for progress

There are also several platform capabilities that stakeholders believe are needed. Topping the list are: *self-service model with complete choice of services and infra* (selected by 58%) and *repeatable routes to production (Golden Paths) that include accelerators and automated builds* (55%).

The need for self-service increases with company size. More than two-thirds (68%) of companies with 20,000 plus employees say they would benefit from self-service.

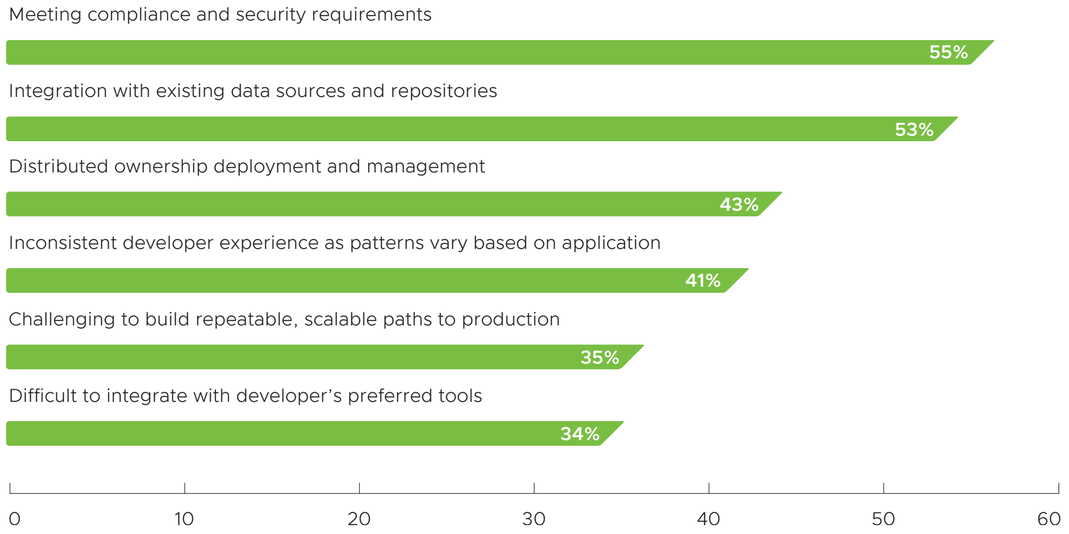

Figure 2: Challenges organizations encountered in building or adopting a cloud native app platform.

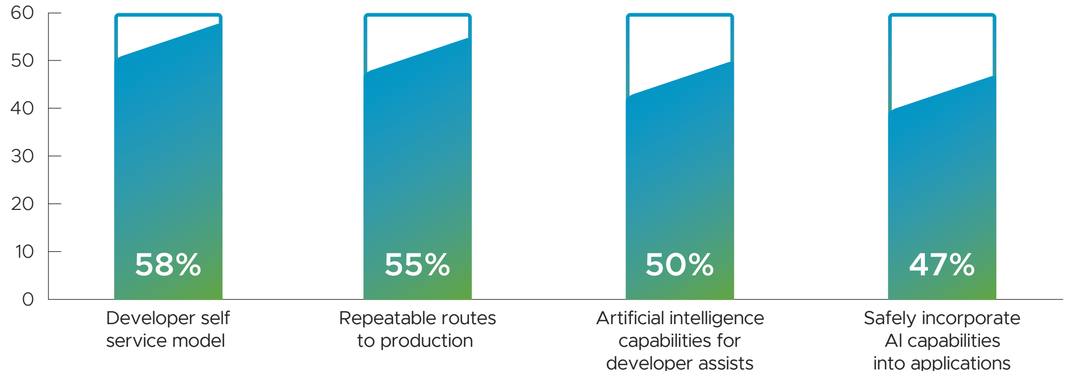

Figure 3: Platform capabilities that would benefit an organization's cloud native app dev and delivery process.

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Mitigating Risk

Stakeholders use cloud native application platforms to address a wide range of important use cases. More than half chose *meeting security and governance requirements* as the top management challenge. Mitigating security, compliance and governance risks are critical success factors for application development and deployment at scale. Well-defined paths to production and curated platforms that integrate with existing tools can help mitigate inherent cybersecurity threats and risks.

Cloud native use cases vary

There were significant shifts in the top cloud native use cases this year. *Deploying and testing applications in a CI/CD pipeline* moved into first place, selected by 54% versus 48% in last year's *State of Kubernetes* report. This suggests that stakeholders are working to integrate cloud native development into existing path-to-production workflows.

Building/managing a cloud native application platform (52%) was a close second, underscoring our shift in focus from Kubernetes to the creation or adoption of comprehensive platforms that streamline application development.

Moving to an open source solution falls at the bottom of the list (30%), suggesting that stakeholders are conscious of the risk and complexity of DIY approaches that increasingly require integration of multiple open source tools.

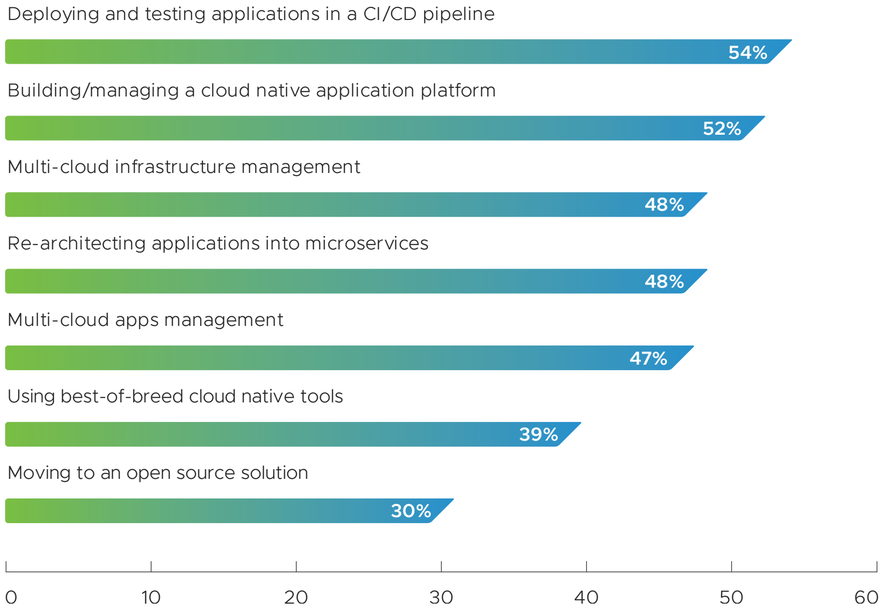

Figure 4: Cloud native use cases companies are currently working on.

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Security and governance top the list of management challenges

This year's management challenges are all about protection and reducing risk. When asked about management challenges, *meeting security and governance requirements* topped the list, with 54%, followed by *applying governance across distributed apps* (46%).

Attention on governance and compliance is widespread

It's clear from this survey that governance and compliance continue to grow in importance in cloud native environments. The same trend is apparent in our 2024 State of Spring report, which examines the latest trends in Java development. Spring stakeholders increasingly take governance into consideration when choosing Spring Projects. Almost two-thirds (61%) of companies with over 100,000 employees now require *architecture team approval*, and 30% require *commercial support*. These governance-related criteria have been gaining ground steadily since the question was first asked in 2021.

Figure 5: Challenges organizations face when managing containerized apps.

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Business decision-makers want governance at scale

When asked about criteria for selecting a cloud native application platform—a new question this year—it's clear that risk and governance are on the minds of business decision-makers. While their top concern is *cost (price and total cost of ownership)*, they are less concerned about cost than non-decision-makers.

The two criteria where decision-makers differ the most from non-decision-makers are *ability to implement governance at scale* (33% versus 21%) and *ability to control your destiny by reducing vendor lock-in* (31% versus 12%).

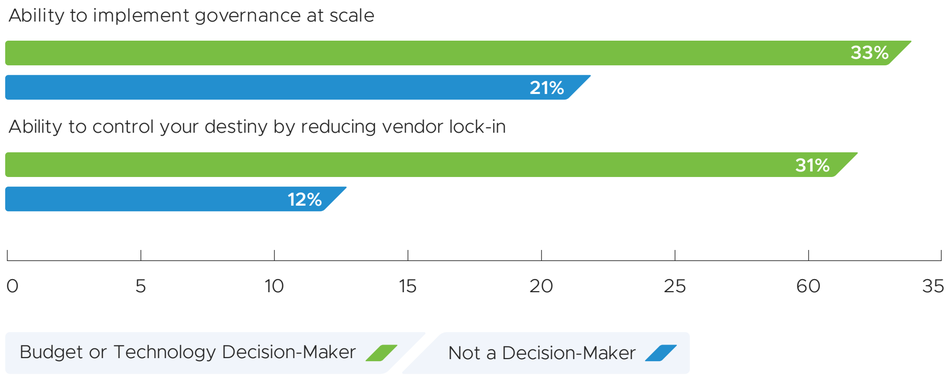


Figure 6: Criteria or capabilities that are most important for organizations when choosing a cloud native app platform or toolset.

Continuous security with the Four R's

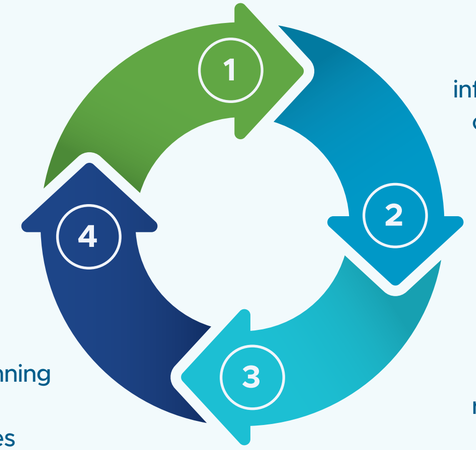
You can continuously protect your apps and infrastructure by automating lifecycle management using what Tanzu terms the Four R's.

REPLICATE

Automatically replicate environments

REPAVE

Continuously re-create app infrastructure using only known-good elements



REPAIR

Actively repair running apps by updating code dependencies based on common CVEs

ROTATE

Automatically rotate credentials and microservice certificates

The result is a stronger security posture and fewer business disruptions, giving operation teams and platform engineers more time to focus on developer experience.

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App Diversity is Driving Platform Proliferation

The majority of organizations are using more than one cloud native application platform. Almost three-quarters (72%) operate multiple platforms—for reasons that include diverse application types and multiple deployment methods—with almost half (46%) operating **three or more** cloud native application platforms. The survey also shows that the more platforms you run, the more challenges you face, indicating a need for a cohesive platform experience.

72% of respondents indicated they are utilizing two or more platform types

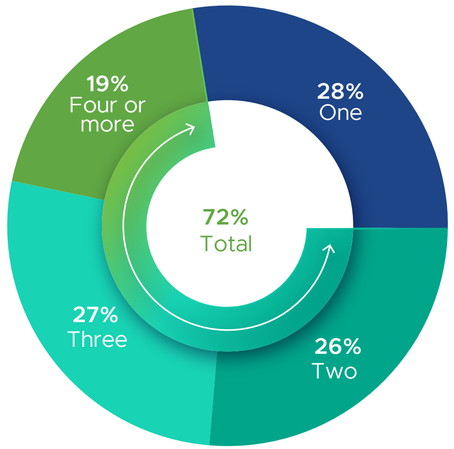

Figure 7: Number of platforms selected.

Multiple cloud native application platforms is the norm

We added several questions to learn more about the cloud native application platforms that respondents are using. The main takeaway is that most organizations operate multiple platforms. Fewer than one third (28%) utilize a single option. About a quarter (26%) run *two platforms*, another quarter (27%) run *three platforms*, and 19% run *four or more*. *Cloud provider-managed service* is at the top of the list of platform types chosen (53%) followed closely by *custom-built using a mix of open source and commercial components* (49%).

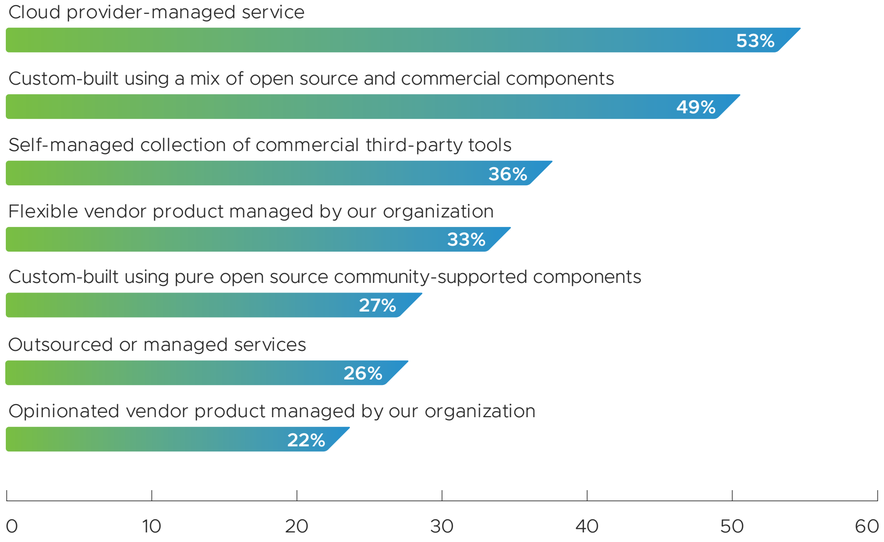

Figure 8: Cloud native app platforms organizations currently use.

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The reality of platform proliferation

Not having anticipated how many respondents are using multiple platforms, we neglected to ask why. Though we will ask this in future surveys, this year we are left to hypothesize what's driving this behavior.

Research is a heuristic endeavor. Using the data we do have we can posit some of the reasons for using multiple platforms.

Application types

Applications run the gamut from *custom applications* (65%) to *existing applications* (58%) to *commercial, off-the-shelf (COTS) software* (32%) to *IoT or edge computing devices* (31%). It's reasonable to expect that this diversity imposes different requirements on cloud native application platforms. We believe this idea is supported by the fact that the organizations running the highest number of different platform types, also have the greatest diversity of application types in their portfolio.

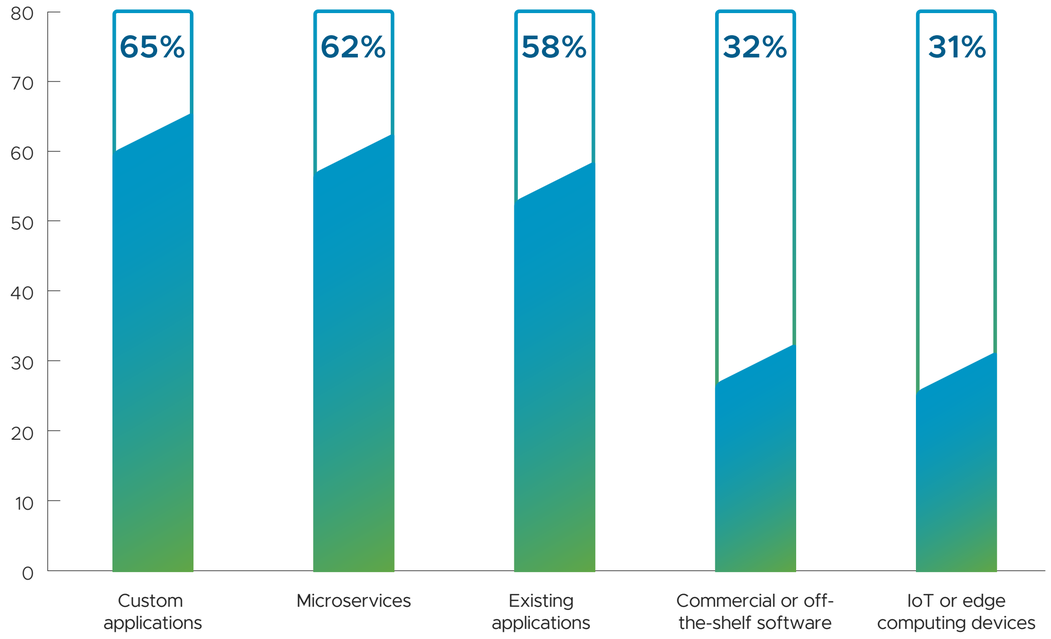

Figure 9: Application types driving organizations' need for a cloud native app platform or toolset.

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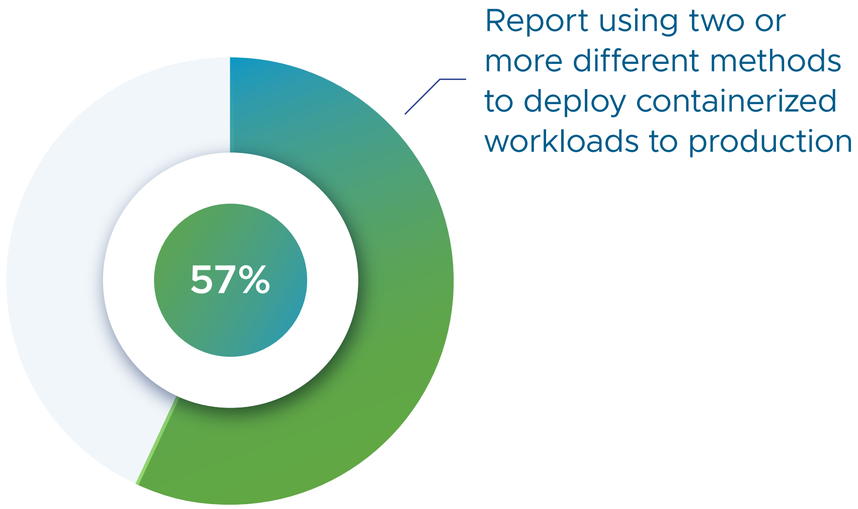
Multiple paths to production

More than half of stakeholders (57%) are using two or more deployment methods for containerized apps. About two-thirds (63%) use YAML, 56% are running Docker containers, and 54% have a *tool to push apps to production via a platform or PaaS*. This diversity of deployment methodology may be driving the need for multiple app platforms.



More platforms mean more challenges

The survey also clearly shows that the more platforms you run, the more challenges you face. Almost without exception, challenges mount as you go from one to two to three to four or more platforms, suggesting an untenable trend.

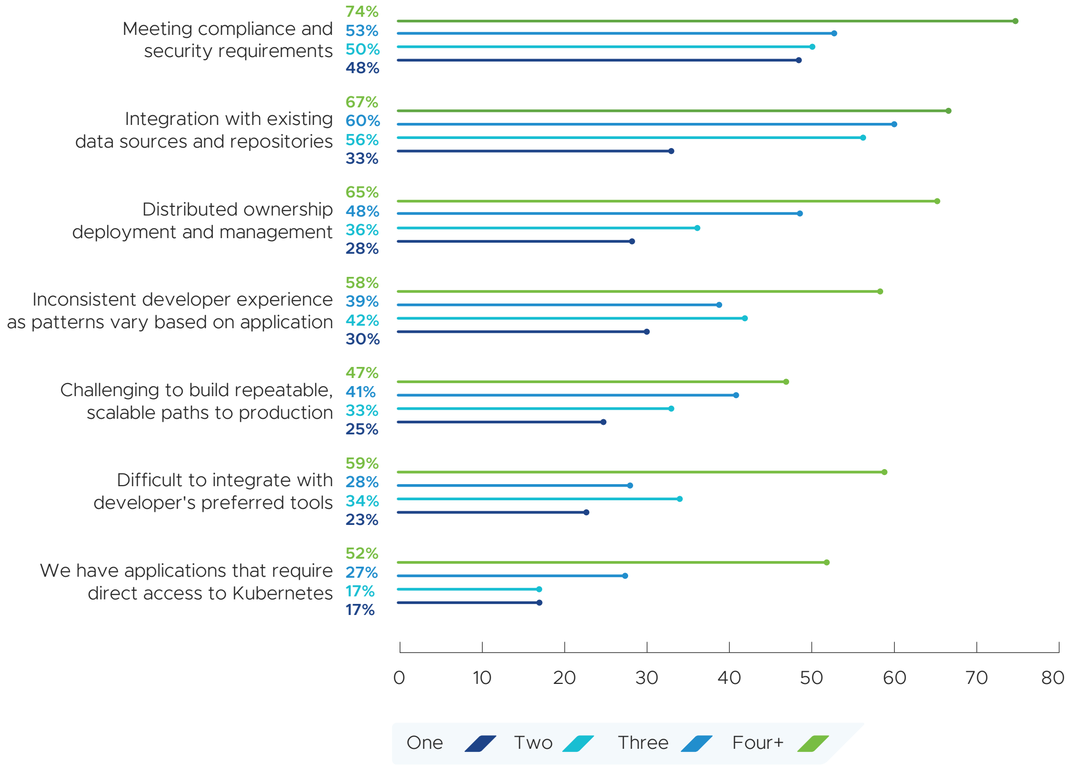


Figure 10: Challenges organizations encountered in building or adopting a cloud native app platform.

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Simplifying Patterns: Delivering Consistency, Repeatability *and* Flexibility

As noted in the previous section, organizations are using multiple platforms. This could be a result of multiple stakeholders having several, seemingly conflicting goals. For example, security teams have different requirements from the business units responsible for delivering new products and attracting new customers, while platform engineering teams are concerned with streamlining processes and reducing management costs. We believe this signals the need for a ***single, consistent platform experience*** that addresses various groups' technical and business needs while reducing risk and improving security posture.

Consistency matters

The organizations managing the most applications have different challenges than those managing the fewest. The top challenges for organizations with *more than 1,000 containerized apps* are *applying governance across distributed apps* (51%), *scaling and managing policies consistently* (49%), and *configuring containers consistently to specifications* (47%). It appears the more apps you have, the more important **consistency** becomes. Consistency is a precursor to quality at scale. In other words, to scale well you need consistency.

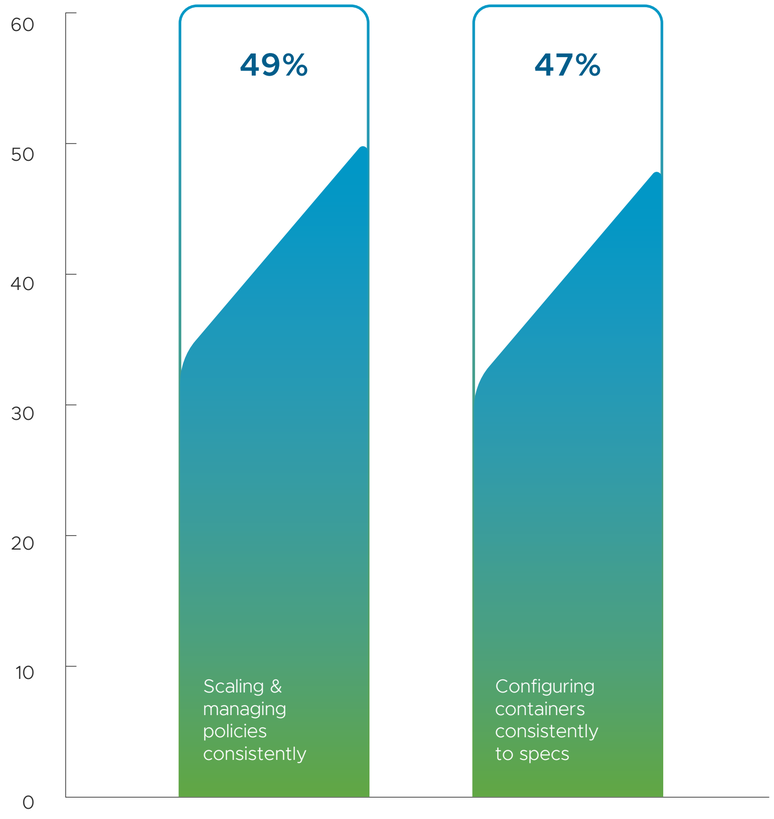

Figure 11: Consistency concerns much more common for companies with more than 1,000 apps.

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Flexibility and repeatability

When asked about new platform capabilities, organizations want a *flexible self-service model with complete choice of services and infrastructure*, but they also want *repeatable routes to production (Golden Paths)*. On the face of it, these two capabilities seem at odds. There's an obvious tension between a desire for flexibility and a desire for repeatability.

We believe a frictionless experience is attainable. Combining cloud native application platforms and modern disciplines like platform engineering and DevSecOps can deliver a flexible self-service model for developers that is curated and consistent. This gives platform teams and security leaders a repeatable and consistent path to production while ensuring that software is delivered faster and with less risk.

Market responsiveness requires agility

Of the stakeholders surveyed, 96% track specific metrics to measure the value of their cloud native application platforms. Top metrics are: *app performance and cost* (tracked by 54%), *deployment frequency* (46%), *mean time to recover* (44%), and *lead time for changes* (38%).

These metrics reflect a need for market responsiveness, including *deployment frequency*, *lead time for changes*, and *mean time to change production code*. While consistency and repeatability can be important for improving on these metrics, having greater flexibility can make it easier to adapt to changing needs and get to market quickly.

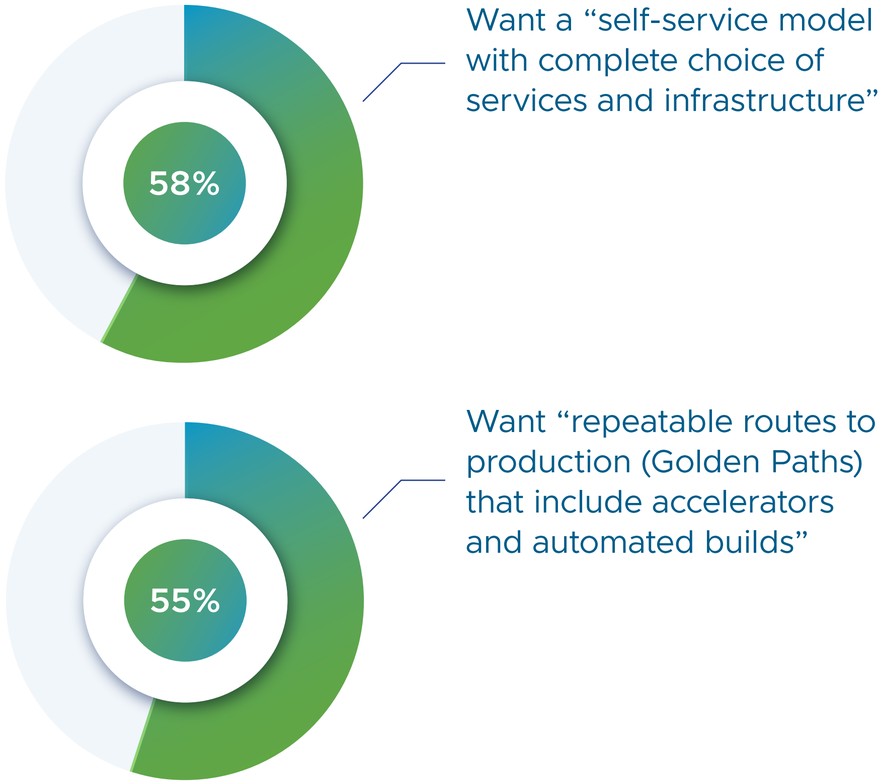
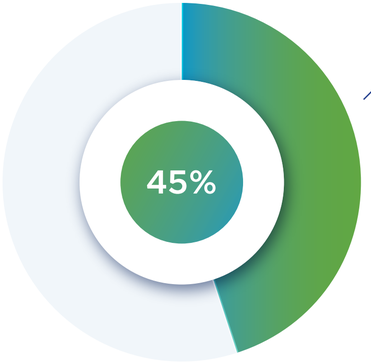


Figure 12: New platform capabilities.

Turnkey *and* customizable

When we asked whether respondents wanted a *customizable platform that enables every compliance and governance setting to be fine-tuned*, or a *turnkey platform with pre-baked governance and security settings*, or a *unified platform that offers BOTH turnkey and customizable options*, almost half (45%) said they wanted both. This could signal a desire to simplify the status quo, but without giving up the flexibility that is a hallmark of a cloud native mindset.



Want a unified platform that offers BOTH turnkey and customizable options

Introducing Tanzu Platform

Teams want a platform designed for them that delivers results quickly and at scale. Until recently, the options have been limited. This is where the Tanzu Platform shines, allowing platform teams to deliver customizable paths to production and Golden Paths suitable for a wide range of applications that can be easily scaled and continuously secured.

What if you could build, bind, deploy, scale, operate and manage all your cloud native apps from a Cloud Foundry or Kubernetes-compatible application runtime with a single click? Tanzu Platform offers a simplified deployment path with opinionated code-to-deployment pipelines AND a path that offers a simple set of common commands for Cloud Foundry or Kubernetes-based applications to help you simplify the path production and get to value more quickly.

Visit tanzu.vmware.com/platform to learn more.

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Summary and Recommendations

Organizations are delivering measurable value from cloud native applications. This year, a greater number of stakeholders are reporting that *IT operators are more efficient* (70%) and *developers are more productive*, and 65% report seeing one or more direct financial benefits. Notably, 43% of decision-makers said that cloud native *helps IT leadership show IT as a revenue driver*, 26% believe *the business is seeing growth in market share*, and 23% said that *profit margins are increasing*.

This year's top challenges are all about security and governance at scale. *Meeting security and governance requirements* (55%) and *applying governance across distributed apps* (46%) are the top challenges when creating or adopting a cloud native application platform, and one third of business decision-makers are concerned about the *ability to implement governance at scale*.

Organizations have deployed multiple cloud native application platforms to address diverse application and business needs; just 28% use *one platform*, 26% run *two platforms*, 27% have *three platforms*, and 19% run *four or more*. But challenges mount as you add platform types, indicating the need for a single platform experience that supports multiple application types and deployment patterns.

There are several underlying factors contributing to platform proliferation. Stakeholders value consistency and repeatability, but they also value agility and market responsiveness. Simplifying app delivery to specific patterns can help address some of these challenges and reduce the cognitive load on teams that have to manage hundreds or thousands of modern apps. While enabling codified patterns or automating certain security and governance processes can help, if you want maximum velocity there are times when flexibility is essential. Innovation is often not a straight line, so having abstractions that cut across the complexity can increase the balance between these needs.

Demographics

This year's survey included **760 qualified individuals**. All had responsibility for containerized applications in an *application delivery, architecture, infrastructure provisioning or maintenance*, or *platform owner role* at a company with more than 1,000 employees.

The survey covers a wide range of industries, regions, and job levels. The top six industries each made up 10% or more of the total sample: *Technology – Software* (14%), *Financial services and insurance* (14%), *Healthcare* (14%), *Retail* (13%), *Telecom* (10%), and *Government* (10%). Other industries represented in the survey included *Manufacturing* (7%), *Services* (4%), *Technology – Other* (3%), *Energy and utilities* (2%), *Transportation* (2%), *Media and entertainment* (2%), and *Education* (1%).

All of the organizations surveyed have a significant software development footprint. About 35% have between 100 and 1,000 developers, 8% have 1,000 to 2,500 developers, and 24% have more than 2,500 developers. New for this year, we asked about *responsibility for applications and infrastructure* instead of specific *job roles*. More than one third (34%) of respondents had *budgetary approval*, 70% were involved in *technology selection*, 76% were involved in *technology evaluation*, and 61% were responsible for *ongoing operations and maintenance*.

VMware commissioned Dimensional Research to conduct this survey. Our thanks as always to the Dimensional team for their diligent work and attention to detail.

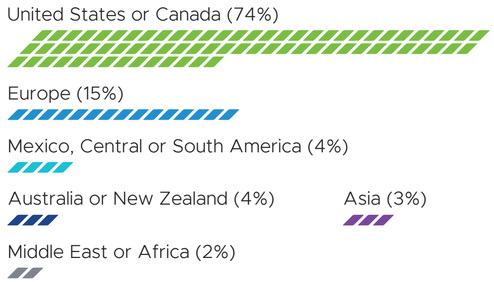

Figure 13: Region of primary operations.

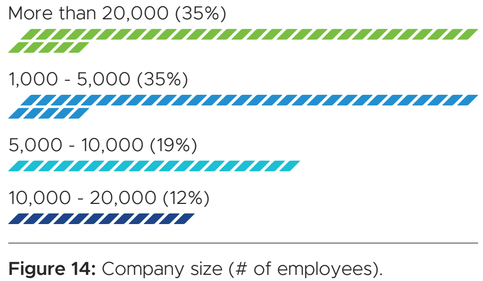

Figure 14: Company size (# of employees).

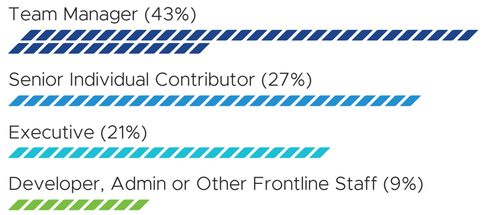

Figure 15: Job level.

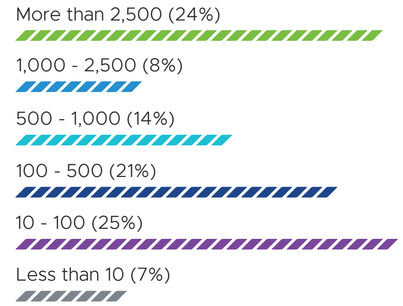

Figure 16: Number of full-time software developers.

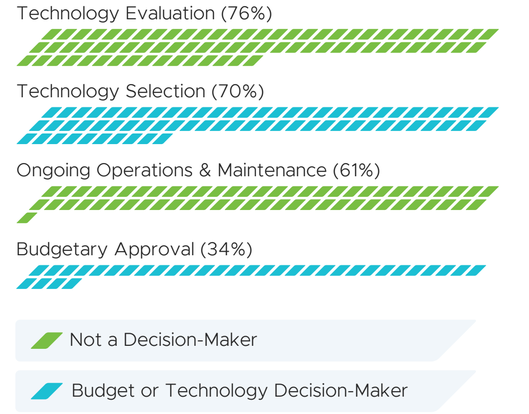

Figure 17: Responsibility for applications and infrastructure.

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