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Operational Maturity Maximizes Multicloud

Scale Operational Cloud Practices To Strengthen Security, Leverage Skills, And Minimize Costs

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Executive Summary

In a 2022 study commissioned by HashiCorp, Forrester explored multicloud's operational potential. In this study, we examine the importance of **operational maturity** and how it maximizes the benefits of multicloud.

Multicloud continues to be the most pervasive cloud strategy chosen by technology practitioners and decision-makers: 86% of respondents at organizations with highly mature cloud operations were planning for, using, or expanding multicloud; 94% of high-maturity multicloud users said it has helped them achieve their business goals or expect it to in the next year.

Today's macroeconomic uncertainty spotlights tight budgets and skills shortages, giving rise to security threats for today's cloud organizations. Organizations that adopt and scale key operational practices to mature their cloud platforms can strengthen their adaptability to market volatility while maximizing multicloud benefits.

In January 2023, HashiCorp commissioned Forrester Consulting to understand the current and evolving state of multicloud operations, along with its drivers, challenges, benefits, and opportunities. Forrester conducted an online survey of 963 global technology practitioners and decision-makers, 93% of whom work at companies of 1,000 employees or more across a range of industries. We identified these respondents and the organizations they represent as high, medium, and low maturity based on their cloud practices across five technology and organizational dimensions: security, applications, infrastructure, networking, and platform team operations. The bottom 25% were identified as low maturity; the middle 50% as medium maturity; and the top 25% as high maturity.

We found that organizations with higher maturity are better optimized for agility, efficiency, and scale in the cloud.

Key Findings

Operational maturity maximizes multicloud business goals and benefits. Eighty-six percent of highly mature technology practitioners and decision-makers were planning for, using, or expanding multicloud; 94% of high-maturity users said either that it's helping them achieve their business goals or that it will in the next 12 months.

Multicloud users benefit from stronger security posture, better visibility, improved automated tooling, optimized costs, and the ability to attract, motivate, and retain new talent. High-maturity organizations are more likely to benefit from every one of these capabilities.

Macroeconomic uncertainty highlights cloud costs, some of which are avoidable. Even amid macroeconomic pressure, 56% of respondents said they're increasing their cloud spend; those at high-maturity organizations are more likely to increase their spend than their low-maturity peers. Notably, 37% at low-maturity organizations didn't change their cloud spend or didn't know what they spent. Regardless of maturity, 94% of respondents were affected by some sort of avoidable cloud costs (aka "cloud waste").

Skills shortages and security threats impede operational effectiveness. Skills shortages (44%) were a critical threat to internal security, after password leaks (50%) and data theft (49%). Lack of skills was also a primary cause of cloud waste for 43% of respondents. Notably, organizations with higher maturity were less affected by these threats.
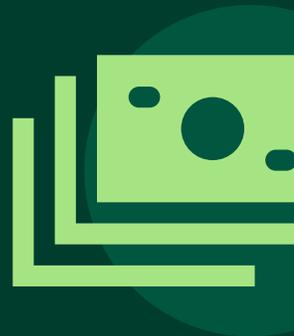
Cloud Maturity

LOW MATURITY: ADOPTING	MEDIUM MATURITY: STANDARDIZING	HIGH MATURITY: SCALING
CRITERIA		
Early implementation or adoption of critical cloud practices.	Standardization on the use of critical cloud practices.	Full-scale adoption and governance of critical cloud practices.

KEY PRACTICES THAT TECHNOLOGY PRACTITIONERS AND DECISION-MAKERS ARE ADOPTING, STANDARDIZING, AND SCALING*				
Infrastructure	Infrastructure as code	Cost optimization tools	Policy and enforcement	Publishing and managing standard images
Security	Secrets management	Encrypting secrets at rest	Data encryption and tokenization	Dynamic secrets
Networking	Cloud networking	Automating networking infrastructure	Securing traffic	Network observability solutions
Applications	Using build pipelines	Continuous integration/ continuous delivery (CI/CD)	Automating container builds	Customizing release pipelines
Platform Team Operations	Taking operational responsibility for site reliability	Developing and standardizing cloud infrastructure strategy	Architecting cloud solutions	Defining and measuring site reliability

*Note: This is a partial list of key practices scored for the maturity model.

Mature Organizations Choose Multicloud For Reliability, Security, And Cost Optimization

Multicloud is the most planned for, implemented, and expanding cloud operating model, and it's most popular among those with highly mature cloud operations.

Technology practitioners and decision-makers continue to recognize multicloud as a valuable approach to accomplishing their business goals. At the same time, they acknowledge the growing need for cost-optimized solutions that will help them adapt and evolve their platforms amid growing macroeconomic uncertainty.

After surveying 963 technology practitioners and decision-makers about the state of their cloud strategy, we found that:

- **Multicloud maturity is synonymous with success.** Eighty-six percent of respondents at high-maturity organizations were either planning for, using, or expanding multicloud — significantly higher than the overall average of 76% (see Figure 1).

  The multicloud operating model is driving success for its broad range of users: 91% said it has already helped them or will help them achieve their business goals within the next 12 months. Maturity helps ensure this success, as the rate grows to 94% for those in the high-maturity group compared with 82% for low-maturity users (see Figure 2).

86%

of high-maturity technology practitioners and decision-makers are either planning for, using, or expanding multicloud.

- **Reliability, cost reduction, and security are core drivers of multicloud use.** Those who had implemented or were planning to implement multicloud were motivated by better reliability (51%) and a need for cost reduction (48%), security and governance (45%), and digital transformation capabilities (45%) (see Figure 3).

- **Multicloud success depends on security and the tools that support it.** Eighty-eight percent of respondents cited security as a critical factor in their multicloud success. To support it, 77% said that data protection/

encryption tools were very important/ important, followed by a growing need for secrets management (75%) and access control and session management (75%). Secrets management and access control and session management have gained in importance since 2022's study; they are now the second and third most critical tools/initiatives to enable success.

- **Budget, staff, and platform teams also play critical roles.** Despite its importance, security alone can't unlock multicloud success. Respondents said that staffing/skill level (82%), budget (80%), and the presence of a centralized platform team (75%) are also foundational elements of a well-rounded multicloud strategy. However, like security, their strength and flexibility are being tested by macroeconomic volatility.

> "[Platform teams] ensure increased performance and more flexibility."
>
> **– DevOps engineer, agriculture, food, and/or beverage, North America**

Figure 1

"Which of the following describes your organization's cloud strategy?"

76%
Multicloud (two or more public and/or private clouds)

High maturity (planning, implemented, and expanding)

Low maturity (planning, implemented, and expanding)

Multicloud (two or more public and/or private clouds)

54%

86%

14% Planning to implement in the next 12 months

24% Implemented, not expanding/upgrading

37% Expanding or upgrading implementation
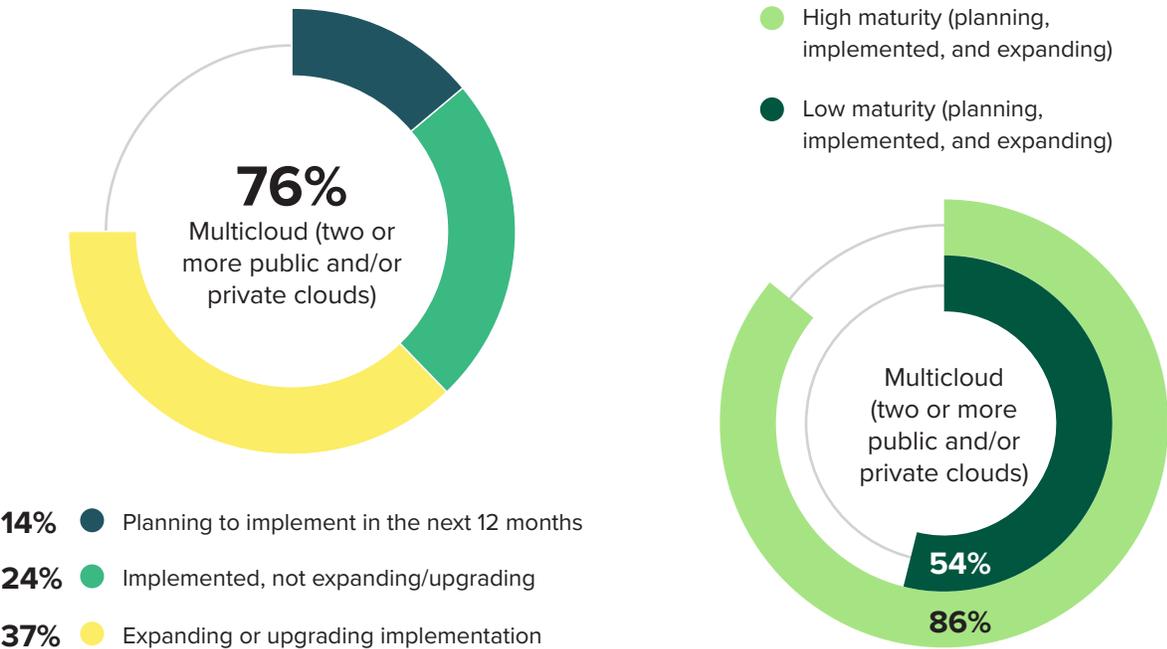
Base: 100 to 957 respondents who are application development and delivery decision-makers with budget authority for new investments
Note: Total percentages may not equal separate values due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Figure 2

"Has your multicloud strategy advanced or achieved your company's business goals?"

- ● Yes
- ● No, but we expect it to within the next 12 months.
- ● No, and we don't expect it to.
- ● Don't know

3%

5%

19%

73%

HIGH MATURITY*

76%
17%
5%
2%

LOW MATURITY†

60%
22%
9%
8%
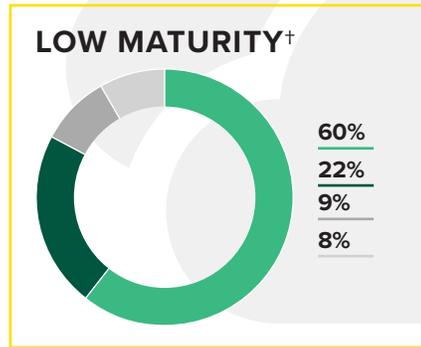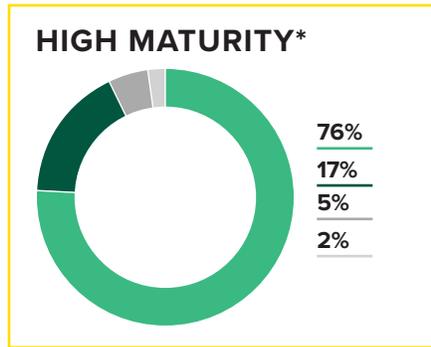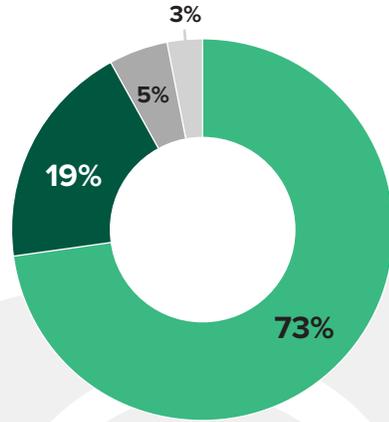
Base: 632 multicloud users who are application development and delivery decision-makers with budget authority for new investments
*Base: 186 multicloud users who are application development and delivery decision-makers with budget authority for new investments
†Base: 108 multicloud users who are application development and delivery decision-makers with budget authority for new investments
Note: Total percentages may not equal separate values due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Figure 3

"What are the business and technology factors driving your multicloud adoption?"

51%
Reliability

48%
Cost reduction

45%
Security and governance

45%
Digital transformation
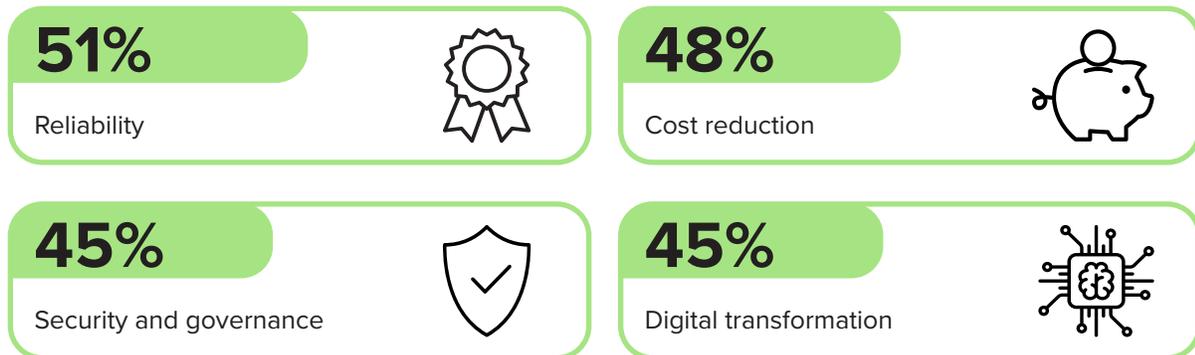
Base: 770 multicloud users/planners who are application development and delivery decision-makers with budget authority for new investments
Note: Showing top 4 responses
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Macroeconomic Pressure Spotlights Costs And Skills Shortages, Increasing Security Threats

The prevailing market volatility and a possible economic downturn are highlighting budgetary pressures for all technology practitioners and decision-makers, regardless of their cloud maturity level or model type.[1] Tight budgets, skills shortages, and security threats in the form of password leaks and data theft impede the progress of multicloud operations. Modern cloud organizations also need to standardize and scale their governance — with the help of platform teams — to create opportunities to adapt and evolve.

Forrester surveyed technology practitioners and decision-makers about their challenges in multicloud operations and found that:

- **Rising costs create a fight-or-flight reaction among cloud organizations.** Fifty-six percent of respondents increased their cloud spending over the past 12 months; 22% decreased it; and another 22% were either unaware of their spending or didn't change it from the year before (see Figure 4). Inflation clearly plays a role here: As a technology cloud VP in the Middle East states, "[Macroeconomic uncertainty] has created high costs of inflation and a supply crunch."

  Respondents at high-maturity organizations increased their spending by 16% on average, compared with an 11% increase in spend for their low-maturity peers. More significantly, 37% of those at low maturity organizations didn't change their investment or didn't know what they spent. Despite high market volatility and inflation, high-maturity cloud organizations are more likely to increase their cloud investments; low-maturity organizations are more likely to retreat in the face of market uncertainty — or ignore it altogether.

"Expenditures have temporarily increased due to the economic environment, but cloud strategy is one of the most important assets ... so we will continue to invest and develop."

– Infrastructure architect, financial services, Europe

Figure 4

"To what degree has the macroeconomic environment caused your organization to decrease or increase (%) its level of cloud spending over the last 12 months?"

● 1% to 24%   ● 25% to 49%   ● 50% to 74%   ● 75% to 100%   ● 100%+   ● Don't know   ● No impact
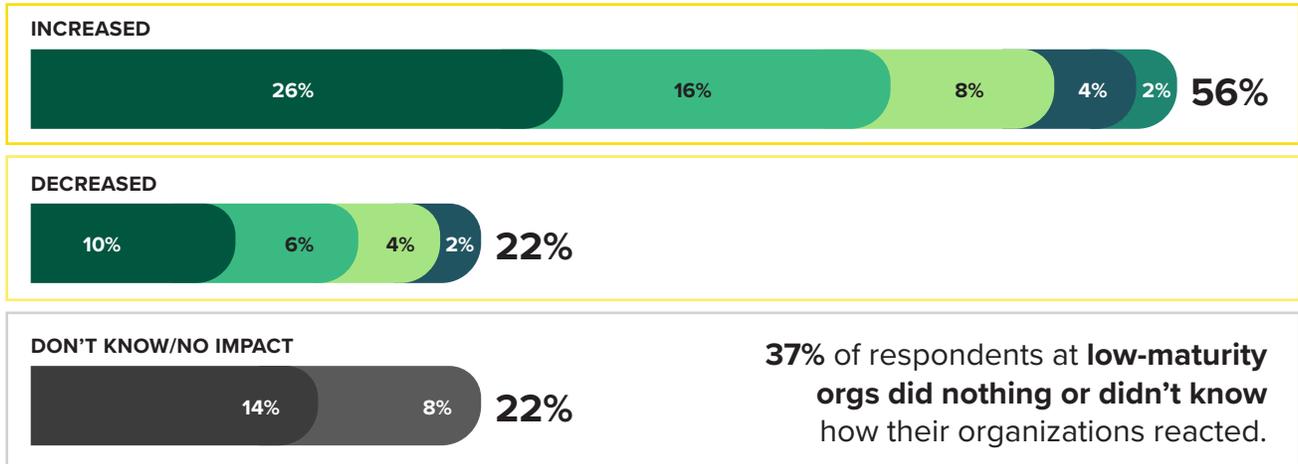
INCREASED

| 26% | 16% | 8% | 4% | 2% | **56%** |

DECREASED

| 10% | 6% | 4% | 2% | **22%** |

DON'T KNOW/NO IMPACT

| 14% | 8% | **22%** |

37% of respondents at **low-maturity orgs did nothing or didn't know** how their organizations reacted.

Base: 957 respondents who are application development and delivery decision-makers with budget authority for new investments
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

- **Eliminating cloud waste is a critical opportunity.** More than nine in 10 technology decision-makers and practitioners stated that their organization experienced one or more types of avoidable cloud spend (see Figure 5). Overprovisioning resources and idle or underutilized resources affected 50% of all respondents. Lack of skills (43%) — not having the right people or capabilities — also contributed to cloud waste. The widespread nature of this issue shows that organizations always have an opportunity to create a more efficient and cost-effective platform, regardless of cloud maturity.

- **Lack of people and processes are barriers to operationalizing multicloud.** As in 2022, skills shortages (27%), siloed teams (26%), and lack of training (25%) were the top three challenges standing in the way of multicloud operationalization.

  Platform teams are a key pillar of operational maturity. These centralized hubs effectively manage people and standardize processes, but organizations need skilled professionals to staff them. Those without platform teams cited a lack of skills/staff (36%) as the reason why they hadn't put one in place to manage their cloud strategy — a rise of 14 percentage points from 2022's State Of Cloud Strategy Survey.

Figure 5

"Which of the following factors contribute to avoidable cloud spend (aka cloud waste) at your organization?"

Overprovisioning resources

50%

Idle or underused resources

50%

Lack of needed skills

43%

Lack of expiration date on temporary cloud resources

39%

Cost premiums based on geographical region

35%

Manual containerization

30%
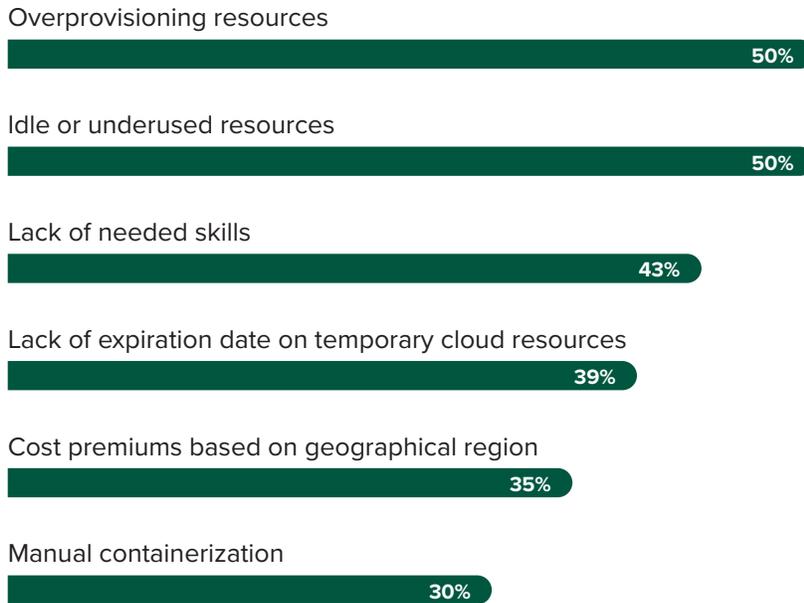
94%
of all respondents had **avoidable cloud spend**.

The other 6% either didn't have any avoidable cloud spend or didn't know.

Base: 963 respondents who are application development and delivery decision-makers with budget authority for new investments
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

- **Securing the cloud is a multidimensional challenge.** Password/credential/secrets leakage (50%), data theft (49%), phishing/social attacks (46%), and ransomware (42%) were the most commonly cited external threats to cloud security; respondents at firms with less mature cloud operations were more likely to encounter three of these four threats (see Figure 6). Low-maturity organizations are less likely to standardize and implement key security practices in the first place.

  Internally, the lack of necessary staff/skills (44%) also contributes to security threats, as organizations require staff to build and operationalize cloud security. Again, this challenge was most prevalent among respondents at low-maturity organizations (52%), while their high-maturity peers were less likely to see the lack of skills as a threat (42%).

"[The macroeconomic environment creates a need for] increased security and staff training to ensure the cloud is sufficiently optimized."

– Networking engineering VP, transportation, Europe

Figure 6

"What are the biggest threats that your organization faces when it comes to cloud security?"

- ● High maturity*
- ● Low maturity*

Password/credential/secrets leakage

50%

47%
61%

Data theft

49%
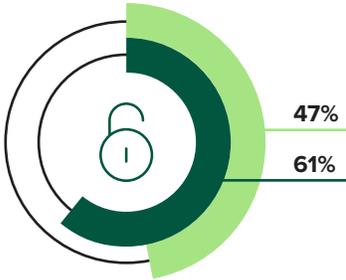
Phishing/social engineering attacks
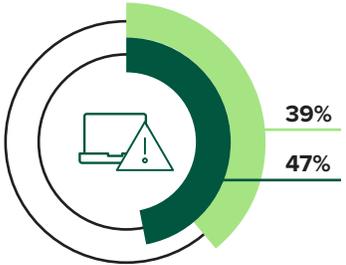
46%

Ransomware

42%

39%
47%

Base: 963 respondents who are application development and delivery decision-makers with budget authority for new investments
*Base: 957 respondents who are application development and delivery decision-makers with budget authority for new investments
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Operational Maturity Strengthens Multicloud Overall

Multicloud approaches provide a variety of opportunities and benefits for businesses. When maximizing the impact of multicloud, the right organizational practices, such as platform teams, are just as important as technical best practices across infrastructure, security, networking, and applications. Platform teams architect and manage a unified approach to cloud consumption by establishing common best practices, thereby acting as centralized hubs of governance and standardization. Despite their popularity, platform teams continue to present an opportunity for technology leaders and practitioners.

Organizations that fully implement these operational cloud practices are better positioned to enhance the benefits they get from multicloud and optimize themselves for success. Compared with low-maturity organizations that are experimenting with cloud practices, those with high-maturity are better prepared to mitigate macroeconomic challenges by leveraging the inherent benefits of multicloud: agility, visibility, automation, security, and staff retention.

- **Maturity enhances multicloud reliability, security, cost efficiency, and staff retention.** Respondents at organizations that execute on a multicloud strategy gained these critical benefits: a stronger security posture (74%), better visibility (73%), improved automated tooling (72%), better uptime/availability (71%), and optimized costs (70%). Multicloud advantages also included people- and process-oriented improvements like greater collaboration (70%), simplified processes and tools (69%), and the ability to attract, motivate, and retain talented practitioners (68%).

  Respondents at high-maturity organizations were more likely to see benefits in each of these categories than those in the low-maturity group — especially for skills retention, attraction, and motivation, where 74% of high-maturity respondents saw a benefit vs. 48% of their low-maturity peers. This shows how mature multicloud organizations that fully implement and scale their cloud practices not only benefit from a technology and business standpoint but also enhance their resilience around talent issues (see Figure 7).

Figure 7

"To what extent has your organization gained the following benefits from its multicloud strategy?"

● We are currently and have been benefiting from this for at least the last 12 months.

● We have only recently begun to gain this as a benefit.

● High maturity
● Low maturity

Stronger security posture

| 42% | 31% | **74%** |

78%
66%

Increased/improved automated tooling

| 39% | 32% | **72%** |

76%
56%

Improved uptime and availability

| 40% | 31% | **71%** |

75%
63%

Optimized costs

| 36% | 34% | **70%** |

76%
57%

Increased collaboration (e.g., fewer silos)

| 36% | 33% | **70%** |

75%
57%

Simplified processes and tools

| 36% | 32% | **69%** |

74%
59%

The ability to attract, motivate, and retain talented practitioners

| 38% | 30% | **68%** |

74%
48%

Base: 44 to 632 multicloud users who are application development and delivery decision-makers with budget authority for new investments
Note: Total percentages may not equal separate values due to rounding; showing seven responses.
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

- **Consistent and automated tooling is the foundation of a secure yet flexible multicloud.** Eighty-three percent of technology practitioners and decision-makers agreed that automation tools are important; 50% said they are extremely important (see Figure 8). Respondents at high-maturity organizations said they have used or would use consistent and automated tooling for improved security and governance (50%), better utilization of cloud resources (49%), more flexible IT infrastructure (47%), and a faster response to IT issues/events (43%). Much like the benefits of multicloud itself, the application of automated tooling is even more effective for high-maturity cloud organizations; these respondents were more likely to benefit in each category (see Figure 9).

- **Platform teams are critical pillars of operational governance and collaboration.** 92% of respondents used platform teams in different technology domains — an increase of 6 percentage points from those who said they had a centralized cloud team in 2022.

"[Platform teams] provide centralized management, improved efficiency, better security, cost optimization, and innovation ... having a platform team can help us achieve a more mature and effective cloud strategy."

– Cloud VP, technology services, North America

Figure 8

"How important are automation tools for your organization to operationalize your multicloud infrastructure?"

83%
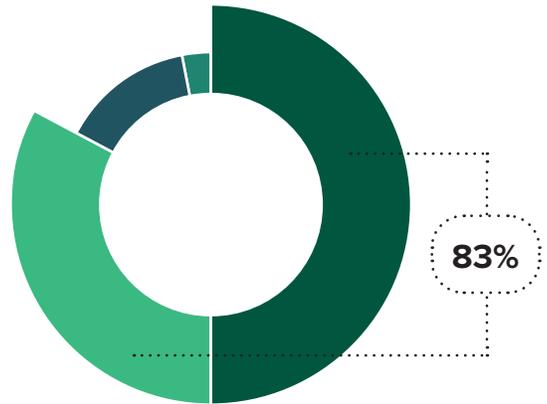
|	
50% ●	Extremely important
33% ●	Important
14% ●	Somewhat important
3% ●	Not important

59%
of respondents at high-maturity organizations say automation is **extremely important** vs. 14% of those at low-maturity organizations.

Base: 963 respondents who are application development and delivery decision-makers with budget authority for new investments
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Figure 9

"How has consistent and automated tooling operationalized your organization's multicloud strategy? Or how would it?"
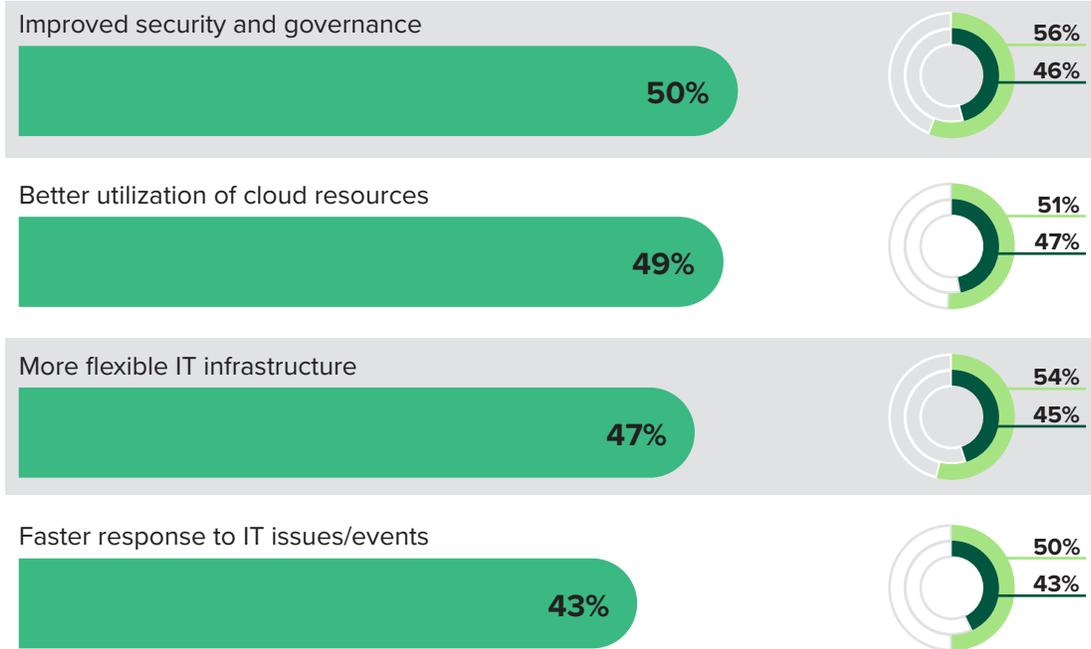
- High maturity*
- Low maturity*

| Improved security and governance | **50%** | 56% / 46% |
Better utilization of cloud resources	**49%**	51% / 47%
More flexible IT infrastructure	**47%**	54% / 45%
Faster response to IT issues/events	**43%**	50% / 43%

Base: 963 respondents who are application development and delivery decision-makers with budget authority for new investments
*Base: 957 respondents who are application development and delivery decision-makers with budget authority for new investments
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Despite their growing usage, only 39% of those who use platform teams were fully scaling the operations of those teams — leaving an opportunity for the 17% and 36% of those at organizations that are still adopting or standardizing, respectively, their platform team usage (see Figure 10).

Platform teams are not only a key component of cloud maturity but also a hub for the operational governance and standardization of multicloud organizations. They govern key challenges and opportunities: security, skills, and cost. For example, security staffing/skills issues impacted only 43% of those with platform teams compared with 56% of those that didn't have platform teams.

"[Platform teams] maximize reliability and security."

— Director of infrastructure, manufacturing, Europe

Figure 10

"To what extent does your organization utilize a platform team to formally manage your cloud strategy?"

39% ● We are scaling the use of a platform team throughout the organization.

36% ● We are standardizing on the use of a platform team.

17% ● We are adopting a platform team.

6% ● We do not use a platform team at all.

1% ● Don't know
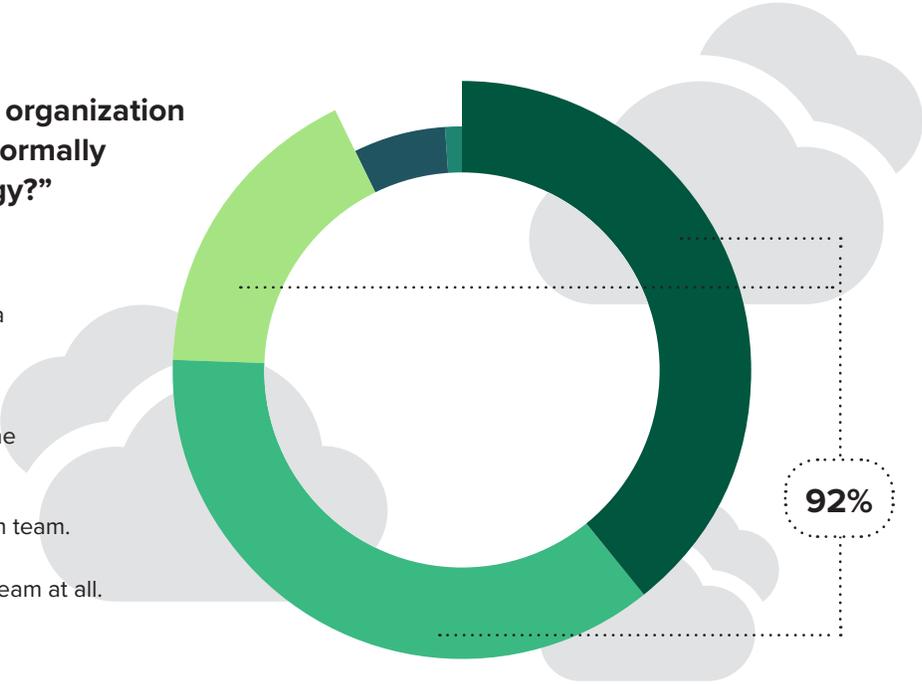
92%

Base: 963 respondents who are application development and delivery decision-makers with budget authority for new investments
Note: Total percentages may not equal separate values due to rounding.
Source: A commissioned study conducted by Forrester Consulting on behalf of HashiCorp, February 2023

Key Recommendations

To maximize the benefits of multicloud and stay agile and adaptive during times of market uncertainty and change, organizations need to mature and align key dimensions of their cloud operations — and ensure that crucial aspects like security, automation, and platform teams are in place. This year's in-depth survey of 963 technology practitioners and decision-makers, conducted by Forrester and commissioned by HashiCorp, yielded several important recommendations.

Macroeconomic shifts demand higher levels of automation.

"Do more with less" has never been more important. Firms must take drastic steps to cope with economic uncertainty amid the elevated expectations of all stakeholders. Avoidable cloud waste and cost efficiencies are important areas of improvement. To win, serve, and retain customers, tech leaders are turning to automation rather than relying on inefficient, insecure, and error-prone manual processes. Mature organizations are also expanding the scope of automation to achieve scale, increase efficiency, reduce cost, and minimize their dependence on key resources. Automation enables higher levels of resilience, an important driver of multicloud adoption.

Mature your multicloud practices and align them with your business strategy.

In a multicloud world, it is imperative for tech leaders to align their investments with business strategy. Most business scenarios demand agile yet mature operations, requiring you to standardize and scale key practices across infrastructure, security, applications, and networking. Platform teams enable scale and maturity, allowing organizations to align with and maximize their support of business objectives.

Address security from all dimensions.

The state of cybersecurity today requires a multidimensional security practice, especially for those exposed to multicloud environments. It's impossible to build an enduring and successful company without mature security operations.

Mature firms manage security by auditing it as well as enforcing rules and policies centrally. When automated, the cloud is even more secure as well as easier and less expensive to manage. Automation helps security leaders execute with speed by detecting and remediating security vulnerabilities, ensuring safer and secure environments.

Upskill and mature your platform teams.

The increasing complexity of technology poses a constant challenge to organizations; they must make the most of relatively scarce skills, especially cloud skills. High-maturity firms explore and take advantage of all possible routes to upskilling — training, certification, and partnerships with systems integrators and outsourcing providers. However, these trainings and certifications won't matter if you lack a culture that supports and promotes learning. As they gain maturity, platform teams can both influence and benefit from such a culture. Exposure to multicloud enforces a matrixed organization, and platform teams help govern it. A mature platform team is one way to effectively expand the benefits of multicloud to the larger organization.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 963 application development and delivery practitioners and decision-makers (e.g., enterprise architects, business process management roles, and IT roles). These respondents have budget authority for new investments at global organizations in technology, financial services, telecommunications services, manufacturing and materials, retail, healthcare, education, and more. For these individuals and the organizations they represent, we identified high-, medium-, and low-maturity organizations using scores across five technology and organizational dimensions: infrastructure, security, networking, applications, and the implementation of platform teams. Each area accounted for 20% of the total scored. Twenty-five percent of respondents were low maturity, 50% were medium maturity, and 25% were high maturity. Survey questions also asked about macroeconomic uncertainty, cloud spend, and the challenges and opportunities of multicloud operations. Respondents were offered a small incentive as a thank you for time spent on the survey. The study began in January 2023 and was completed in February 2023.

Appendix B: Demographics

REGION	
North America	36%
EMEA	34%
Asia Pacific	24%
Latin America	6%

INDUSTRY	
Tech/tech services	25%
Financial services/insurance	14%
Telco services	6%
Manufacturing	5%
Retail	5%

LEVEL	
Practitioner	64%
Director+	36%

| SIZE	
15,000+ employees	25%
8,000 to 14,999 employees	12%
5,000 to 7,999 employees	15%
2,000 to 4,999 employees	22%
1,000 to 1,999 employees	20%
500 to 999 employees	2%
100 to 499 employees	3%
2 to 99 employees	1%

TOP 6 POSITIONS	
DevOps engineer	10%
Cloud engineer	8%
Cloud architect	7%
Developer	7%
Solution architect	6%
Director of information technology	6%

RESPONSIBILITY

- ● I am knowledgeable in this practice, but not responsibile for it.
- ● I influence decisions related to this practice at my organization.
- ● I am part of a team making decisions for this practice.
- ● I am the final decision-maker for decisions related to this practice.

INFRASTRUCTURE	18%	26%	37%	15%
APPLICATIONS	21%	29%	31%	13%
NETWORKING	25%	27%	31%	12%
SECURITY	21%	31%	34%	10%
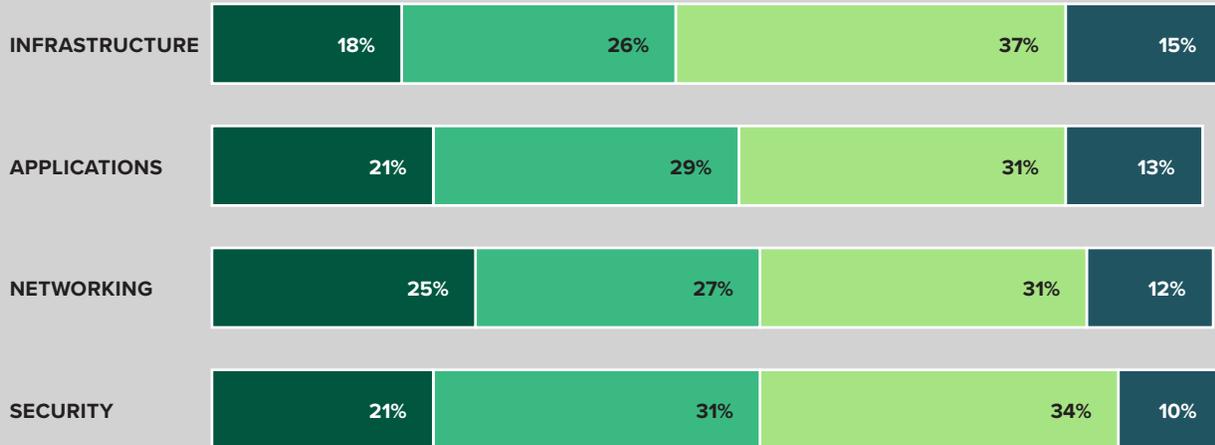
Appendix C: Supplemental Material

RELATED FORRESTER RESEARCH

"Prepare Your Technology Outsourcing Program For An Economic Downturn," Forrester Research, Inc., February 23, 2023.

Appendix D: Endnotes

[1] Source: "Prepare Your Technology Outsourcing Program For An Economic Downturn," Forrester Research, Inc., February 23, 2023.

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