



The **Cloud Complexity** Report **2025**

Benchmarking enterprise cloud, security, and AI readiness

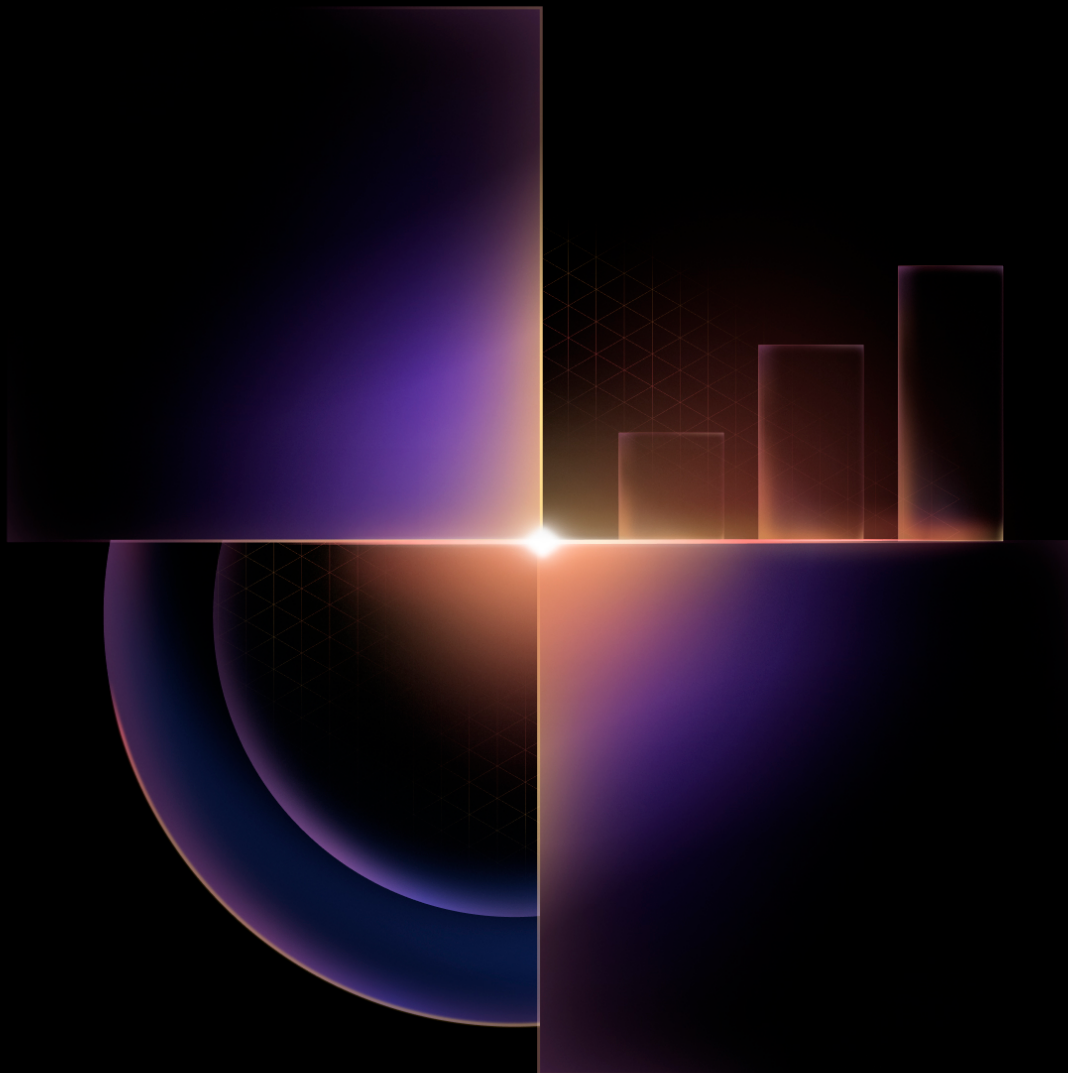


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Introduction

Cloud complexity is proving to be a challenge for organizations, with fragmented cloud operations increasing risk, wasting resources, and slowing innovation. So, how can organizations leverage cloud platforms to drive innovation, rather than stifle it? To find out, HashiCorp – an IBM company – partnered with independent market research agency Vanson Bourne to survey 1,100 IT, DevOps, platform, and software engineering decision makers globally, to understand:

- How cloud platforms are driving innovation across three core areas: risk, speed, and cost
- The role of automation and AI in accelerating innovation
- The future of cloud adoption, including current gaps, emerging challenges, and opportunities

The cloud fuels innovation, but its growing complexity is becoming an obstacle. As organizations accelerate their cloud adoption, they find themselves navigating an ever-expansive landscape of tools, providers, and environments. This introduces a variety of challenges.

As the report will highlight, the cost of having a complex cloud environment is not solely financial. Yet, there is a path from chaos to control. And, when looking ahead, artificial intelligence (AI) is set to be a critical driver of cloud innovation. However, unlocking its full value and effectively utilizing infrastructure to enable AI workloads demands a strategic, integrated approach that prioritizes:

- **People** (the individuals and teams within the organization)
- **Skills** (the specific abilities and expertise those people possess)
- **Processes** (the structured methods and workflows used to get work done)

This white paper explores the challenges created by overly complex cloud infrastructures and how a unified approach that incorporates automation software can help overcome this complexity and drive innovation.

HashiCorp helps organizations cut through cloud complexity with a unified platform for managing the entire infrastructure lifecycle.

Foreword

By Armon Dadgar, Co-Founder & CTO, HashiCorp

Cloud promised agility, innovation, and scale. But for too many organizations, the reality is fragmented environments, sprawling toolsets, and out-of-control costs. Complexity has become the new barrier slowing progress, increasing risk, and making it harder to deliver on the promise of cloud.

At HashiCorp, now part of IBM, we've long believed the answer isn't more tools, it's a unified approach to managing infrastructure and security across the full lifecycle of a hybrid cloud. This report reinforces what we're hearing across boardrooms, platform teams, and security organizations around the world — that success requires more than technology. It demands an operating model that spans people, processes, and platforms, with clarity of ownership and a commitment to secure, automated, scalable operations.

We also see AI emerging as a powerful accelerant. But AI doesn't solve complexity; it amplifies it when built on fragmented foundations. Unified lifecycle management, with strong governance and security controls, is the only way to scale both infrastructure and AI confidently.

For leaders looking to benchmark where they are today and where they need to go next, this research offers clarity. To truly do cloud right, organizations must simplify, unify, and automate. That's how we move faster, with security embedded to give us the control required to turn infrastructure from a challenge into a competitive advantage.

Armon Dadgar

KEY FINDINGS

KEY FINDING 1

Organizations are dealing with multiple environments, tools, and providers

52%

rank multi/hybrid cloud complexity among their **top three infrastructure cloud management challenges**.

IMPLICATION

Cloud complexity is holding back the potential of the cloud to drive innovation at speed and scale, creating a need for a more unified approach.

KEY FINDING 2

There is a lack of collaboration/alignment between teams

73%

report their platform engineering team and security personnel **do not work as a unified function**.

IMPLICATION

To mitigate security risks and drive innovation, organizations must align the people and processes responsible for infrastructure and security.

KEY FINDING 3

Unified lifecycle management overcomes cloud complexity

51%

say better visibility and monitoring of multi/hybrid cloud usage is a benefit from using a unified lifecycle management platform.

IMPLICATION

Investing in unified lifecycle management is essential to reducing risk, improving governance, optimizing costs, and scaling confidence.

KEY FINDING 4

Automation software is key for ensuring cloud innovation

56%

of Transformative organizations (those who are driving innovation and continuous improvement, leveraging infrastructure to create a competitive advantage) are prioritizing improving AI-driven automation to ensure cloud success over the next 12 months, compared to 46% of Tactical organizations.

IMPLICATION

Cloud complexity is holding back the potential of the cloud to drive innovation at speed and scale, creating a need for a more unified approach.

Cloud complexity: An obstacle to innovation

To better understand cloud complexity and its source, assessing organizations' current approach to cloud infrastructure is primary. Almost three-fifths (**58%**) are using a hybrid model for their cloud setup; indicating that they have some of their applications or infrastructure running in the cloud, while others are on-premises. And tool sprawl – a mass of multiple, often redundant, IT tools – is prevalent. The vast majority (**97%**) of organizations use multiple tools and/or services to manage their cloud environments – averaging at **5**. Unsurprisingly, this is creating a considerable challenge for organizations. Some are turning to unified platforms like The Infrastructure Cloud to regain control.

The vast majority (**97%**) of organizations admit struggling with their cloud infrastructure, with a similar proportion (**98%**) facing associated cost challenges. Their biggest cloud infrastructure challenge, cited by more than half (**52%**), is the complexity of managing multi/hybrid cloud environments. This complexity comes at a financial cost and is reported as the second biggest cost challenge – the first being security and backup costs. Evidently, organizations are finding it difficult – and costly – to deal with so many tools. And it doesn't stop there. The concept of tool sprawl undermines visibility, increases the attack surface, and complicates compliance.

5

the average number of tools/
services used to manage
cloud environments

Infrastructure cloud management challenges ranked within top 3

52%

Complexity of **managing**
multi/hybrid environments

49%

Keeping an up-to-date
security approach

42%

Maintaining a strong
compliance posture

Cloud Infrastructure cost challenges ranked within top 3

42%

Reactive **cost** management
and visibility

47%

Security and **backup** costs
(encryption, disaster recovery,
resilience)

41%

Costs of **managing** a complex multi
and/or hybrid cloud environment

This tangled environment can often lead to extended deployment cycles and slow time to market, as teams can struggle to coordinate across disparate systems and processes. As a result, people across the organization experience lost productivity and operational friction, with the potential for valuable resources being diverted from innovation to troubleshooting and integration.

Automation and reusability, embedded within a unified lifecycle management platform, are key enablers for minimizing operational friction and cloud complexity. To reduce costs and complexity, organizations can leverage automation to handle routine tasks, accelerating deployment cycles and shortening time to market. While reusability ensures best practices are consistently applied, which reduces duplication of effort, and simplifies governance and compliance. Together, these capabilities highlight the importance of a unified approach to cloud management – essential for protecting organizations' bottom line and driving faster, more secure, and reliable innovation.

“If you have around 500 teams and every one of those teams is doing things a slightly different way, I would say that this is never going to become really effective. ... I want to really make sure that you understand that it's really important to have a unified automation platform in your environments.”

Steffan Wagner, Field CTO, HashiCorp

Without a forward-thinking strategy, cloud complexity becomes more difficult to manage

Organizations take different approaches to managing their cloud infrastructure. Half take a Transformative approach, where they drive innovation and continuous improvement, leveraging infrastructure to create a competitive advantage. But the remaining half either take a Strategic approach (35%) – operating with a defined plan – or Tactical (14%) approach – focused on immediate needs.

Cloud infrastructure approach

Tactical

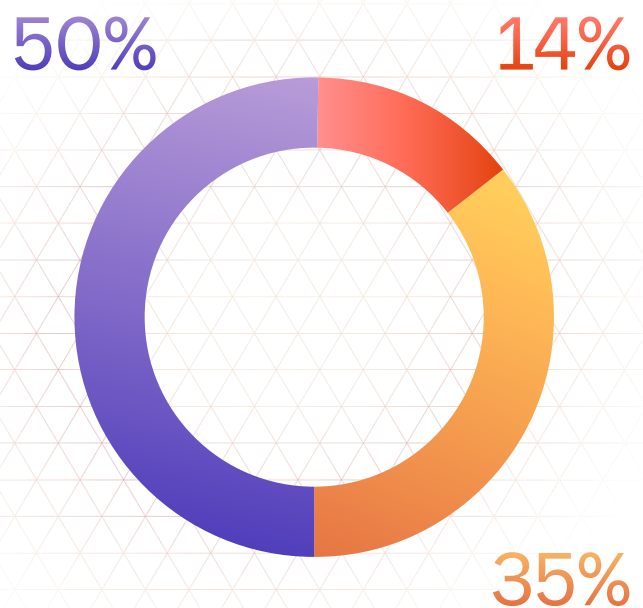
Focused on immediate needs, solving challenges as they arise

Strategic

Operating with a defined plan, aligning infrastructure efforts with wider business goals

Transformative

Driving innovation and continuous improvement, leveraging infrastructure strategy to create a competitive advantage

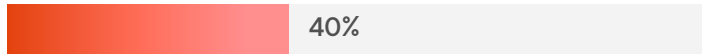


Connecting services

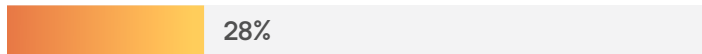
AS % STRONGLY AGREE

Connecting services across different cloud and or on-premises environments can be challenging

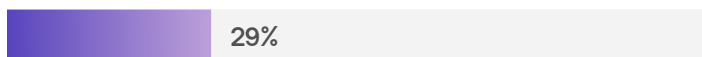
Tactical



Strategic



Transformative



Gaps in maintaining efficiency and security

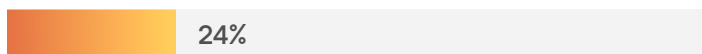
AS % STRONGLY AGREE

There are gaps in maintaining efficiency and security across their cloud and/or on-premises environments, which can slow down innovation

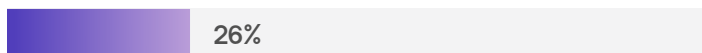
Tactical



Strategic



Transformative



Organizations that take a Tactical approach to managing their cloud infrastructure are more likely to experience coordination challenges across their cloud and/or on-premises environments, compared to those with Strategic or Transformative approaches. This Tactical, reactive approach can lead to inconsistent processes and integration gaps, which could impact efficiency, compromise security and thus, stifle innovation. Conversely, a more proactive strategy can help organizations overcome the integration, efficiency, and security challenges stemming from a reactive approach, enabling faster innovation and more reliable operations. While there's a need to move quickly to stay competitive, sacrificing efficiency or security for speed without a predefined plan can lead to costly errors.

Understanding the sources and challenges of cloud complexity is the first step; the next is to understand how to remove the risks inherent in these dynamic environments.

“I’d reduce tool sprawl by using a unified platform to simplify management and cut costs.”

ITDM (IT decision maker), US

Mitigating risk within complex cloud environments

In complex environments, managing security and compliance at scale not only intensifies operational complexity but also amplifies security risk. How teams are structured and collaborate is crucial to mitigating this risk.

The majority (**83%**) of organizations report they have a platform engineering team. However, to ensure secure-by-design infrastructure, these teams must collaborate closely with security personnel. Yet, almost three-quarters (**73%**) do not operate as a unified function. Misaligned teams can lead to increased vulnerabilities, compliance failures, and avoidable risk.

73%

believe their platform and engineering team and security personnel do not operate as a unified function

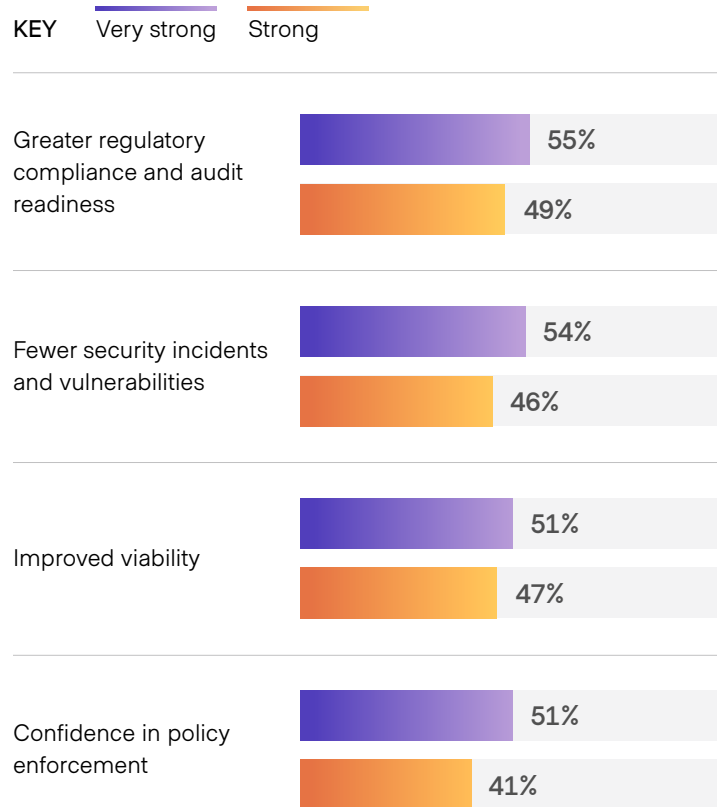
Stronger together: Effective relationships fuel success

Less than half (**46%**) of respondents surveyed report their organization having dedicated security personnel within their platform engineering teams, while 54% work separately. However, strong collaboration – not just team structure – drives results. Organizations with dedicated security personnel within platform engineering report the strongest platform–security relationships, and are most likely to realize key benefits, including:

- Greater regulatory compliance
- Fewer security incidents
- Improved visibility
- Confidence in policy enforcement

This sentiment is recognized among decision makers, with around two-thirds (**64%**) highlighting the importance of strong collaboration and the need to improve their cross-team alignment.

Benefits of a strong/very strong relationship between platform engineering and security



“Make a unified decision about cloud strategy for the whole organization rather than siloed approaches. It would make it much easier for data and process flows to have a unified architecture across the board.”

A lack of unification between teams perpetuates the challenge of balancing innovation with efficiency and security. These results indicate that to mitigate security risks and drive innovation, organizations must take a proactive approach and align the people and processes responsible for cloud infrastructure and security. Security must be interwoven throughout the infrastructure lifecycle, enabling secure-by-default deployment and ongoing management to maintain security and compliance.

This can be difficult to obtain, so what can help overcome these risks?

Collaboration is essential for risk mitigation; however, organizations also need robust tools and processes. We now explore how unified lifecycle management can further empower organizations to tame cloud complexity.

64%

of respondents said they need to improve their platform engineering teams working with operations, security, and networking teams to build a common infrastructure foundation

“Sometimes it feels like we’re operating on too many isolated islands, engineering, security, finance, they all manage cloud in their own little worlds. I’d bring it under one strategic umbrella.”

ITDM in Manufacturing and production, UK.

From chaos to control: How unified lifecycle management overcomes cloud complexity

When Infrastructure and Security Lifecycle Management are integrated, organizations gain a unified approach that addresses the full breadth of cloud complexity. By providing centralized control, automation, and consistent governance, a unified platform helps reduce risk, improve operational efficiency, and support innovation. Drawing together the key cloud complexity challenges, we outline how the benefits of such a platform can effectively overcome them.

Challenge 1: Multiple environments, tools, and providers

Organizations' cloud environments are complex and costly, often involving multiple tools and services. Consolidating cloud management is essential.

By leveraging cloud- and platform-agnostic tools that enable single workflows across all environments, organizations can simplify operations, reduce costs, and improve efficiency. Centralized control eliminates blind spots, standardizes security, and enables proactive governance.

Benefit of a unified lifecycle management platform

CHALLENGE 1

51%

of organizations consider 'better visibility and monitoring of multi/hybrid cloud usage the most likely benefit of a unified lifecycle management platform

Challenge 2: Issues with security and compliance

Keeping an up-to-date security approach and maintaining a strong compliance posture are among the top three infrastructure cloud management challenges experienced. Security and backup costs add to these challenges. However, organizations with a Transformative approach to cloud infrastructure tend to better maintain security and efficiency across their cloud environments, when compared to those with a Strategic or Tactical approach.

Such a platform can provide consistent security controls across the entire infrastructure cycle, from development to production. By aligning workflows and applying policy as code principles, it streamlines governance, reduces risk from misconfigurations, and empowers innovation with greater speed and confidence.

Challenge 3: Cost challenges

Fragmented tools are driving up costs and reducing efficiencies. Organizations are especially struggling with reactive cost management and visibility within their cloud infrastructure. Therefore, the complexity of cloud environments means that organizations are not able to properly plan for and manage the costs associated.

Using a unified platform can help consolidate multiple tools and centralize infrastructure to deliver scalable operations and minimize costs. By standardizing on a solution that provides a single system of record and abstracts the underlying infrastructure complexity, platform teams can shield developers from the intricacies of cloud environments, enabling them to build and deploy faster without needing to manage the operational burden.

Benefit of a unified lifecycle management platform

CHALLENGE 2

56%

of organizations place security and compliance as their top consideration when looking for unified management

CHALLENGE 3

37%

of organizations see the cost of multiple tools as a benefit of unified lifecycle management platforms

Challenge 4: Lack of collaboration/alignment

Many platform engineering teams and security personnel are not collaborating as effectively as they could be. Yet, strong relationships cultivate the best results.

Challenge 5: Fragmentation and tool sprawl lead to slower time to market

It's likely that fragmentation and tool sprawl can slow time to market by extending delivery cycles, reducing productivity, and increasing cognitive load for developers – especially in hybrid environments. This can hinder efficient collaboration and stifle innovation.

Faster deployment and on-demand scaling help organizations overcome fragmentation and tool sprawl by centralizing automation, streamlining toolsets, improving visibility, and enabling efficiency. This unified approach is essential for maintaining control, reducing risk, and accelerating innovation in complex cloud environments.

Benefit of a unified lifecycle management platform

CHALLENGE 4

51%

Over half of organizations say unified lifecycle management platforms improve collaboration and standardize workflows, helping teams move from reactive firefighting to proactive, secure innovation

CHALLENGE 5

48%

Almost half of organizations consider faster deployment and scaling on demand of applications a benefit of unified lifecycle management platforms

AI: The next frontier of cloud success

Looking forward, AI infrastructure and automation are set to be critical drivers of cloud innovation.

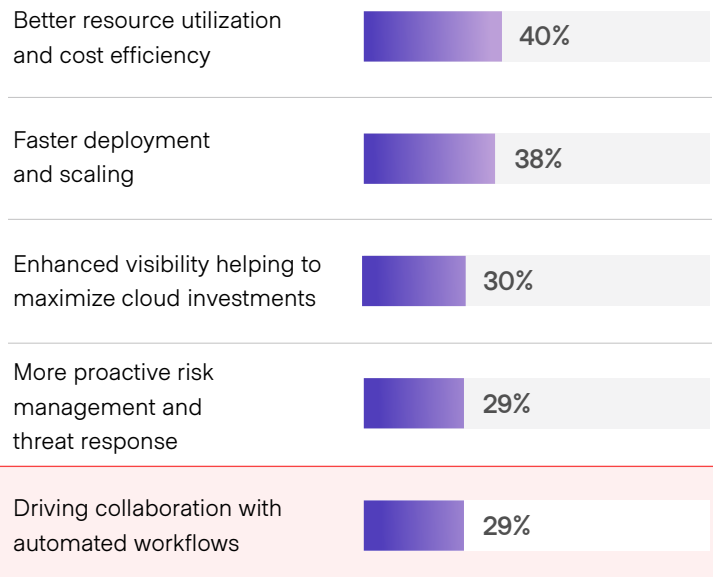
The research indicates that more than half (**56%**) of infrastructure provisioning and application deployment is automated, on average. Organizations recognize the value this delivers, highlighting its potential for faster, more accurate resource provisioning. This helps to eliminate bottlenecks through automated pipelines and accelerated deployment and scaling.

Proactive risk management allows for embedding security policies and identifying risks early for prompt mitigation. Nearly three in ten (**29%**) say it drives collaboration with automated workflows, with those with high levels of automation considerably more likely to report this as a benefit. This is likely due to increased visibility and alignment seen through automated workflows, providing teams with a shared view of workflows, progress, and issues. This can help support transparency, enabling faster, more confident decision-making that drives innovation.

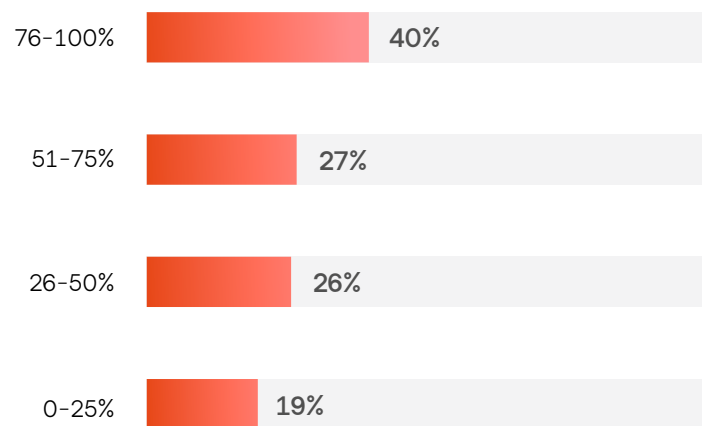
Realizing the full potential of AI and automation requires a strategic and integrated approach, focused on formalizing a secure infrastructure operations model. To ensure cloud success over the next 12 months, organizations are prioritizing:

- AI/ML skills for optimizing cloud cost (55%)
- AI-driven automation for cloud infrastructure management (52%)
- Executive alignment on AI strategy (50%)

Top five benefits from automating infrastructure provisioning and application deployment



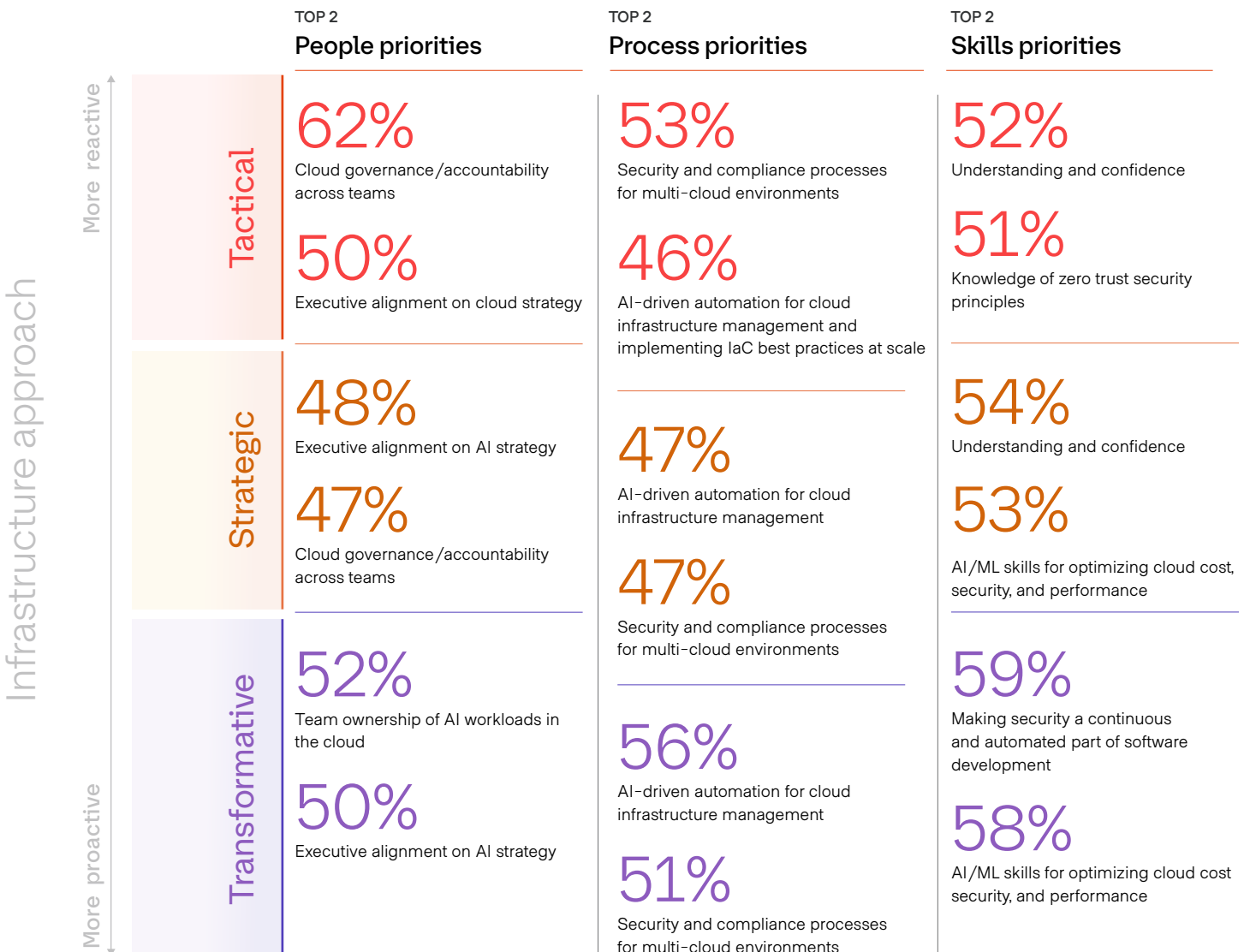
Split by % of infrastructure provisioning/ application deployment that is automated



However, with infrastructure for AI tools being among the top cost challenges (39%), organizations must invest in the right technology to ensure sustainable, cost-effective options are chosen. AI workloads are complex and resource-intensive, so organizations need to run them on secure, scalable infrastructure to ensure they are reliable and cost efficient. Without unified policy-enforcing platforms, like HCP Terraform and Vault, AI will only amplify existing risks. This highlights the importance of investing in the right infrastructure for AI in order to keep pace with the rapidly evolving AI landscape.

AI success belongs to organizations that master infrastructure first

Tactical and Strategic organizations are at risk of lagging behind Transformative organizations and may not realize the true potential of AI and automation in the next 12 months.



Those with a Tactical approach are having to focus on establishing effective management of their cloud infrastructure and security, with clear strategies/ accountability yet to be defined. Until these foundations are in place, AI cannot be effectively prioritized, and there is a risk that this group will fall further behind as Strategic and Transformative organizations continue advancing with AI-driven automation.

Those with a Transformative approach are putting AI at the heart of their strategy so that they can drive innovation and leverage cloud infrastructure to gain a competitive advantage. They are continuing to prioritize AI infrastructure in the future, ensuring clear ownership across teams, advancing automation, and investing in upskilling.

Organizations with a Strategic approach are balancing a wide range of priorities in an effort to match the pace of Transformative organizations. However, it's important that this doesn't dilute focus.

By unifying infrastructure and security practices and investing in the right skills, organizations create the operational foundation needed to scale and adopt AI successfully.

“One change we’re making is getting infrastructure involved earlier in product planning, instead of being brought in at the very last minute.”

ITDM in Retail, Canada

“We are investing in scalable cloud-based platforms to enable proactive capacity planning and innovation.”

Platform Engineering DM in
Financial Services, Australia

Conclusion and three steps

Driven by the proliferation of tools, cloud providers, and environments, cloud complexity is an escalating cost for organizations. This difficulty snowballs into issues with security, cost management, and the inability to innovate at speed.

The approach to managing cloud infrastructure shapes the ability to overcome complexity and achieve cloud success. Those with a Transformative approach to cloud infrastructure – driving innovation and continuous improvement – experience greater benefits from their cloud than those with a Tactical or Strategic approach. These benefits include smoother integration of services across different cloud and/or on-premises environments and fewer challenges in maintaining efficiency and security across their environments, creating a stronger foundation for innovation. This is evidence that there is an opportunity for organizations to streamline their cloud arsenal in order to facilitate innovation and continuous improvement.

Ultimately, it highlights a need for a unified approach that will strategically embed automation in cloud infrastructure, facilitating the refinement of cloud infrastructure and aiding a more Transformative approach.

Three steps to overcoming cloud complexity

1

Unify your cloud lifecycle management approach

Cloud environments are busy with multiple tools, services, and providers, creating unnecessary complexity and inefficiency. It's necessary to strengthen your cloud management and streamline your cloud toolset. A more unified approach can help to improve visibility, reduce costs, enable faster time to market, and make it easier to scale securely.

2

Align infrastructure and security teams

Misalignment between platform engineering and security teams is a driver of security and compliance challenges. Establishing clear communication channels and ensuring strategic alignment between these teams from the start is essential. Create strong collaborative platform-security relationships to ensure implementation and standardization of security tooling and requirements.

Terraform and Vault provide a workflow where infrastructure and security teams can collaborate on secure infrastructure provisioning, automate compliance, and reduce the risk of misconfiguration or secret exposure.

3

Invest in AI-driven automation for cloud optimization

AI is becoming a critical differentiator; demanding organizations invest or risk falling behind. AI-driven automation is essential for managing the lifecycle of complex AI workloads, enabling organizations to deploy, monitor, and scale models efficiently in dynamic cloud environments. Cloud success demands a foundation of secure, scalable infrastructure and robust governance to ensure automation operates reliably and safely. Integrate AI-driven automation to manage the lifecycle of your complex AI workloads.

Across all three steps

The most successful organizations treat cloud not as a one-time project but as a journey of continuous improvement. By embracing a growth mindset, they regularly refine practices, adapt to emerging risks, and capture new opportunities for innovation. This ongoing discipline ensures the foundations they put in place today continue to deliver value tomorrow.



Methodology

In May–June 2025, partnering with Vanson Bourne, HashiCorp surveyed 1,100 senior to mid-level IT, DevOps, platform and software engineering decision makers from organizations in US (400), Canada (100), UK and Ireland (100), France (100), Germany (100), Netherlands (50), Spain (50), Singapore (50), Australia and New Zealand (50) and Japan (100). They had 1,000 or more employees and came from a range of public and private sectors.

About HashiCorp

HashiCorp, an IBM company, helps organizations automate hybrid cloud environments with Infrastructure and Security Lifecycle Management. HashiCorp offers The Infrastructure Cloud on the HashiCorp Cloud Platform (HCP) for managed cloud services, as well as self-hosted enterprise offerings and community source-available products. For more information, hashicorp.com.

About Vanson Bourne

Vanson Bourne is an independent specialist in market research for the technology sector. Their reputation for robust and credible research-based analysis is founded upon rigorous research principles and their ability to seek the opinions of senior decision makers across technical and business functions, in all business sectors and all major markets. For more information, visit www.vansonbourne.com