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BLACK & WHITE PAPER

# Delivering Greater Value to Your Business by Reducing Management Complexity

COMMISSIONED BY

kyndryl™

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# About this paper

A Black & White paper is a study based on primary research survey data that assesses the market dynamics of a key enterprise technology segment through the lens of the "on the ground" experience and opinions of real practitioners — what they are doing, and why they are doing it.

## ABOUT THE AUTHOR

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Eric Hanselman is the Principal Research Analyst at 451 Research, a part of S&P Global Market Intelligence. He has an extensive, hands-on understanding of a broad range of IT subject areas, having direct experience in the areas of security, networks, application and infrastructure transformation and semiconductors. He coordinates industry analysis across the broad portfolio of 451 Research disciplines, contributes to the Information Security and Cloud Native Channels, and is a member of the Center of Excellence for Quantum Technologies.

# Introduction

Enterprises are facing a new set of business challenges, and IT infrastructure has to achieve new levels of speed and efficiency to keep them competitive. Enterprise IT has always been a complicated environment to manage effectively; changing business demands and fluid application architectures have kept IT teams on their toes as they try to keep it all running smoothly. Enterprises have increasingly been adopting hybrid multicloud, which has heightened the complexity of managing these new infrastructure models. With a readily available set of development tools, there is more pressure on IT teams to deliver at least the same level of service they had achieved with on-premises systems in the expanded mix that hybrid entails. As IT consumers get used to hyperscale service models, their expectations can reach even higher.

Hybrid environments often grow gradually, driven by business imperatives, and frequently without coordinated infrastructure growth. Infrastructure can also grow suddenly and dramatically through mergers and acquisitions or consolidation, creating a need to manage what are often dissimilar environments as a seamless whole. In either case, without integrated and aligned management systems, operations consume far too many resources and create dependencies that mire any advancement or business transformation in complex processes.

To ensure that organizations remain competitive and successful, IT teams need to streamline management in ways that will simplify operations and create a foundation that will allow their organizations to adapt to ever-changing business priorities. Effective and efficient management operations will allow them to satisfy business imperatives that are critical for organizations to achieve their best possible outcomes.

Kyndryl, formerly known as IBM Infrastructure Services, and 451 Research have conducted a study to look at the challenges that users of hybrid environments are facing in managing their infrastructure. The study looks at the current state of hybrid multicloud infrastructure and explores ways to increase the effectiveness of management strategies to improve efficiency, increase security and build resilience. This report delves into the study's implications for improving the management of hybrid multicloud and is a companion to another report that explores the ways in which they can be optimized.

## Key Findings

- IT teams have to tackle greater complexity in managing hybrid cloud environments.
- A third of respondents reported a lack of integrated management.
- Security is the leading management challenge by a wide margin.
- More than three-quarters (83%) believe they could be 'more' or 'much more' effective than they are today.
- Digital transformation is now more critical than ever to be competitive.
- Respondents see skills gaps as limiting their efforts to improve efficiency.
- The scale and scope required for the shift to containers challenges management systems and processes.
- Organizations' management capabilities can handle existing demands, but they will need help from service providers to deliver tomorrow's enterprise requirements.

## Methodology

451 Research conducted a study with a global panel of 1,805 senior business and IT decision-makers who reported having experience in hybrid cloud infrastructure design and use. In the study, we asked about their opinions on the state of their existing IT infrastructure, their management tools and practices, and their plans. The study included 11 industry vertical sectors in North America, Europe, Asia-Pacific, the Middle East and Africa, and Latin America. The study was administered as a 21-question web-based survey instrument in June 2020.

# Challenges of a Complex World

Hybrid cloud is a reality for most organizations today. The way they leverage new and different infrastructure options varies, but they're all starting to experience the additional complexity associated with hybrid cloud. That complexity is raising concerns about the ability of IT teams to deliver on business initiatives that their organizations require, and many of those concerns center around effective management in a hybrid multicloud world. The study explored the nature of these concerns and expected impacts for the businesses they support.

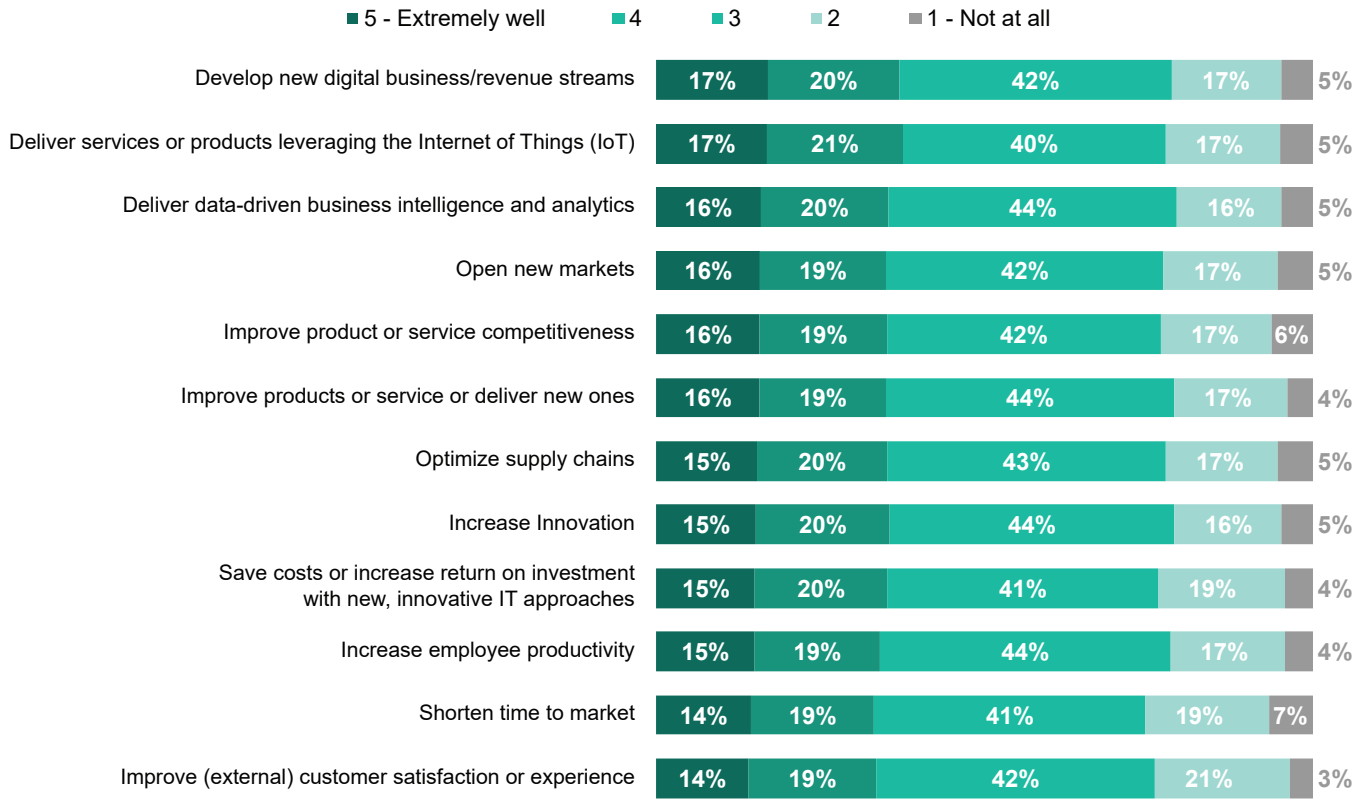
The study established a set of common business imperatives and asked respondents to identify which of these their teams were being tasked with. Our goal was to identify the perceived state of their management practices and systems by getting views on how well they could achieve these imperatives. We looked at respondents' perceptions about their ability to deliver on these business initiatives with their current IT infrastructure (Figure 1). The answers did not offer a vote of confidence for their current state. Just under a quarter felt that their readiness was poor (a score of one or two). Just over 40% rated readiness a three for most initiatives, which implies a lack of confidence in what they have in place. Only about 15% said that they could deliver extremely well.

Figure 1: Ability to deliver on business initiatives

*Source: 451 Research custom survey*

*Q: With the IT infrastructure you currently have in place, please rate your IT department's ability to deliver on the following business initiatives?*

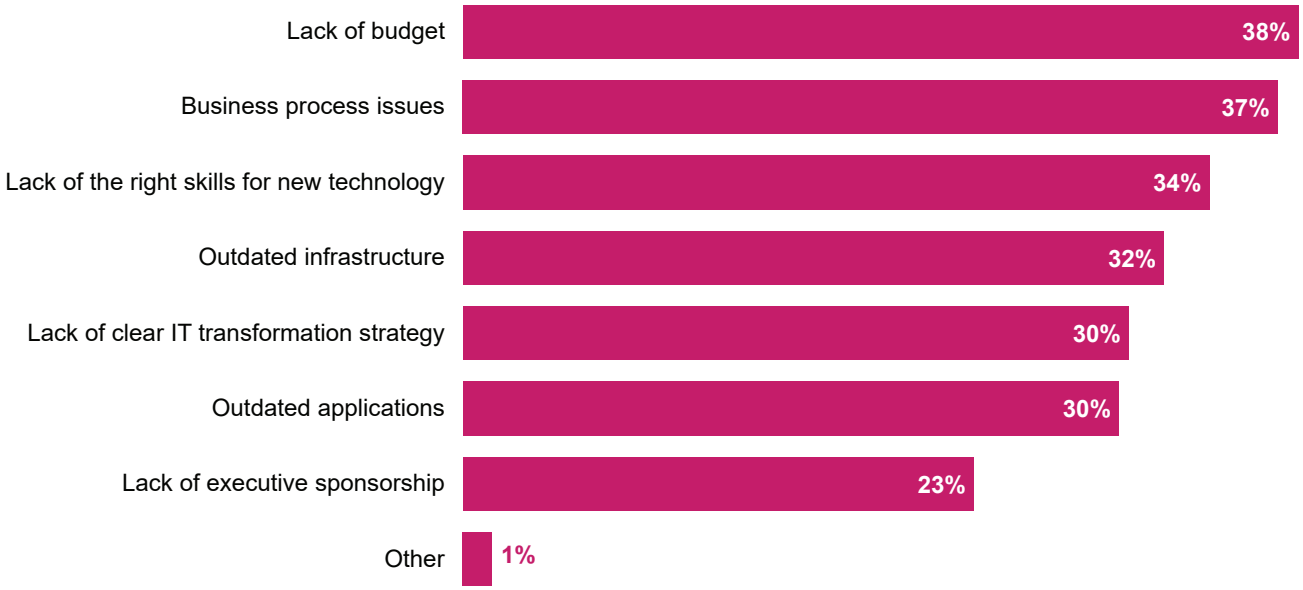
*(Multi-Select Response; n=1,555)*




While respondents reported budget as being the top inhibitor to delivering on business priorities, business process issues and lack of skills to support new technology followed closely behind (Figure 2). The second- and third-ranked responses offer insight into the issues created by complex hybrid environments and how these are crippling efficiency within organizations. With such a wide skills gap, organizations will have difficulty hiring the talent needed to address it. Business processes can be tied to existing technologies, becoming an anchor that is difficult to dislodge. These complications could be particularly problematic when it comes to supporting the innovations needed in today's business climate.

Figure 2: Challenge blockers

*Source: 451 Research custom survey*
*Q: What are some 'blockers' preventing your organization from delivering on these challenges? (Multi-Select Response; n=1,805)*




To lift themselves up to higher levels of capability, organizations will need to embrace better management tools and procedures and consider how they'll reskill their existing workforce. This is why they'll need investment in people, processes and systems that will help them overcome skills gaps, operate more efficiently and increase operational visibility. The study results show that hybrid multicloud is a reality, and businesses need to adapt their ability to manage this new model to get the most from the benefits that it can yield. A look at the changing nature of IT infrastructure gave us some clues as to where those investments in technology and retraining could be made.

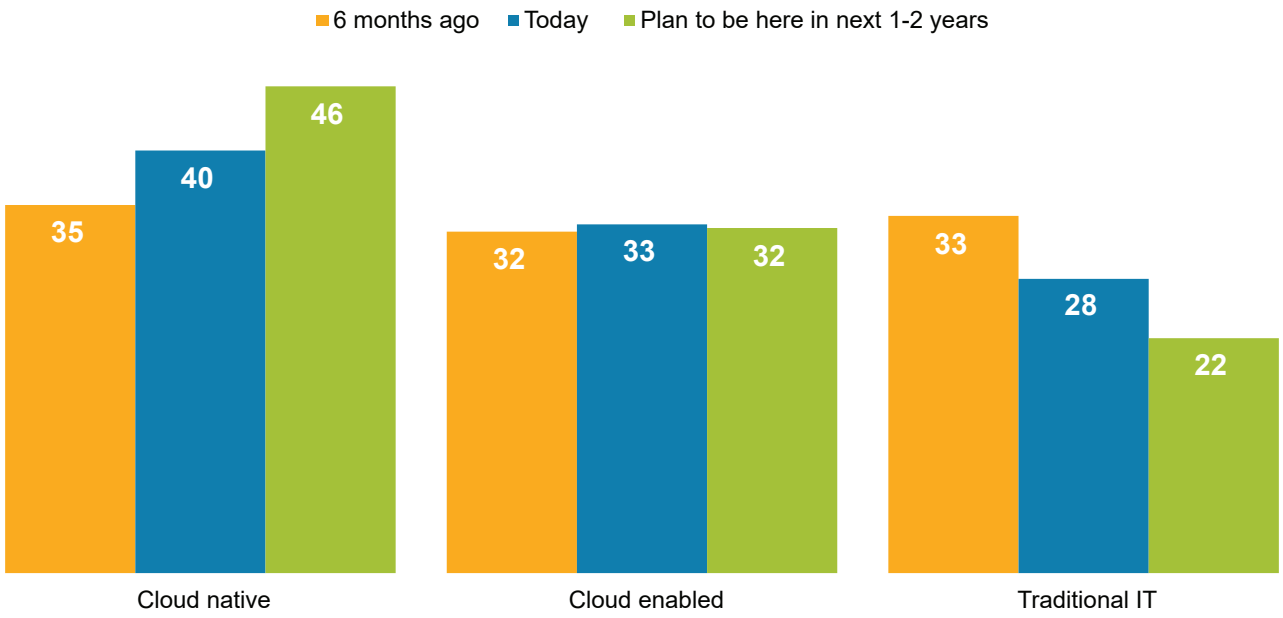
# Building Hybrid Infrastructure

Our study looked at respondents' shifts in expectations regarding how they will build capacity to support their businesses using hybrid multicloud environments. They characterized the models in which they're deploying workloads on these environments and expressed the belief that there will be decreasing employment of traditional IT, using physical or virtual systems that are individually provisioned. They're already solid users of cloud-enabled patterns, those in which cloud-style provisioning is used to allocate resources. Just short of a third of their workloads are reported to run this way, and they expect that to continue.

There is a growing expectation that cloud-native technology will replace traditional IT (Figure 3). The study defined cloud native as using DevOps operational patterns and hybrid multicloud infrastructure. Respondents said they expect cloud enabled and cloud native to coexist, indicating that management capabilities will need to support both for the long term, as well as integrate traditional environments as they phase out.

Figure 3: Workload environment trends and indicators

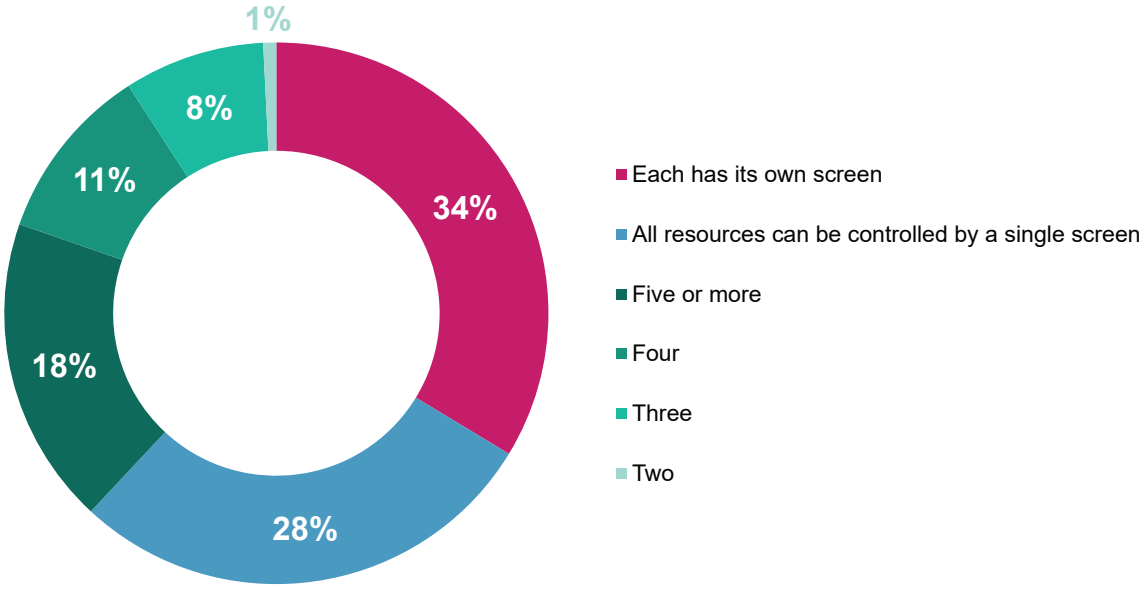
*Source: 451 Research custom survey*
*Q: What percentage of your workloads run in each of the following environments?*
*% response (n=1,805)*



This transition to cloud native is happening in a management environment that is already complicated. While a variety of factors in the recent past have dramatically impacted IT teams, the demands being placed on management capabilities are long-term and more difficult to address directly. The study looked at the complexity of existing management systems by asking respondents about the number of resources that could be managed by a single management system (Figure 4). Over a third indicated that each of their resources has its own management environment, and a full 72% said they have multiple management systems in place. At best, that means administrative staff have to develop skills that span these various systems. For many organizations, it can mean separate teams managing different environments. This latter case can increase complexity, as operations in different resource silos may not be well coordinated.

Figure 4: Number of resources controlled through a single management system

*Source: 451 Research custom survey*
*Q: How many of your different resources (private cloud, public cloud, virtual estate, storage array) can be controlled through a single management system (single screen, console or pane of glass)?*
*(Single-Select Response; n=1,805)*




There are increasing pressures on IT budgets, and complex management environments can put a particularly strong burden on them. What often starts out as a small project, with operational needs that are relatively limited, can rapidly grow beyond forecasted budget needs if, for example, the project is successful and grows without integrating into a more efficient operational model. This kind of creeping growth is dangerous to budgets and makes planning difficult.

# Business Imperatives Driving Complexity

Management complexity can be a particular issue when IT teams are taking on important business initiatives. Organizations need to be able to adapt to changes in the business landscape to stay competitive, and IT teams have to be able to support those changes with the necessary technology and infrastructure. Management system complexities can hamper the ability to deliver on those initiatives; we saw those concerns in Figure 1. To better understand the requirements of the various initiatives, the study looked at different types of initiatives that respondents are currently undertaking and those that they expect in the next 12-18 months (Figure 5). Increasing innovation led decisively in both time frames. Supporting innovation can take many forms, but the hallmarks of innovative management are processes and technologies that can support experimentation with low cost, minimized risk and the nimbleness needed to outpace competitors.

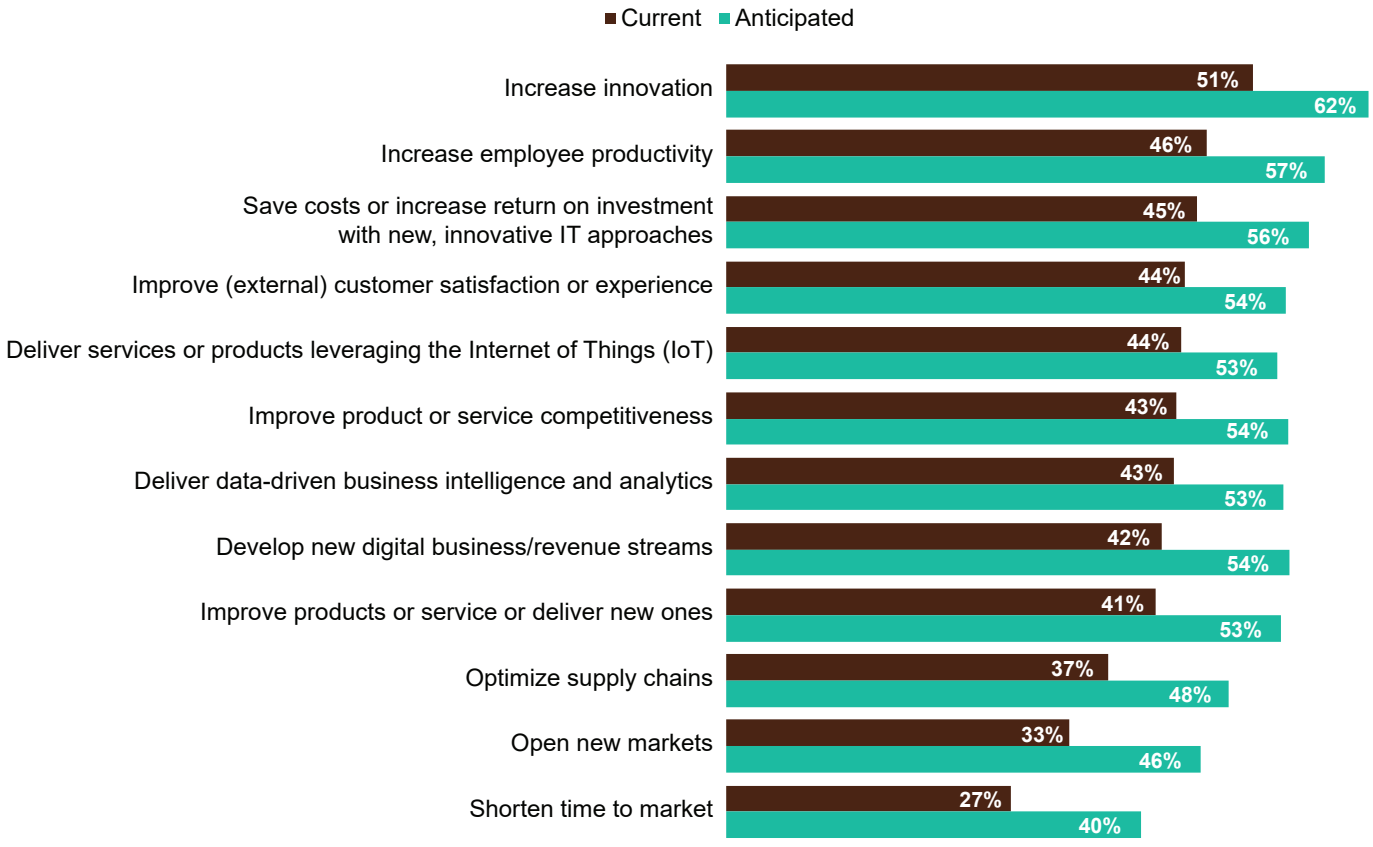
## Figure 5: IT help with business initiatives

*Source: 451 Research custom survey*

*Q: Which of the following initiatives is your IT department currently helping with now? OR: Which are you currently asking your IT department to help with now? (Multi-Select Response) (n=1,555)*

*Q: Which of the following initiatives do you anticipate your IT department helping within the coming 12-18 months? OR: Which do you anticipate asking your IT department to help within the coming 12-18 months?*

*(Multi-Select Response; n=1,555)*



# Concerns About Existing Capabilities

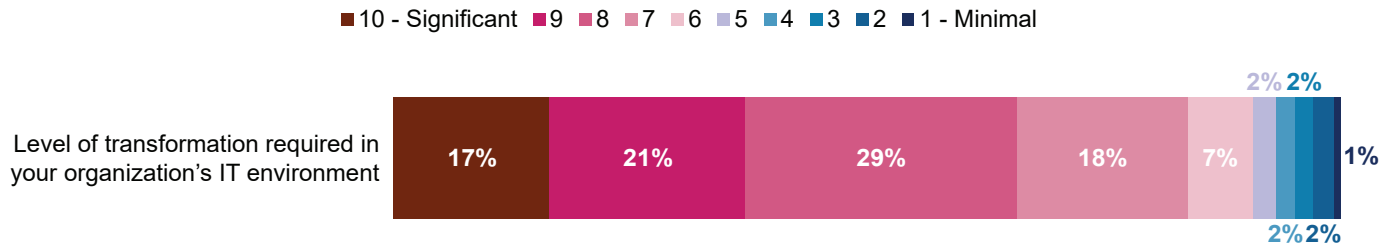
As we saw in the responses about the ability to deliver on business initiatives in Figure 1, there is broad concern about their existing capabilities. While there might always be some concern about readiness, we wanted to quantify the gap between the current state and expectations of future need. We asked about the level of transformation needed in IT environments to meet new business strategies over the next five years. Over two-thirds (67%) felt that they required a level of at least eight out of 10 in transformation. That's a high level of concern about the amount of work that will be required to make their environments ready.

Figure 6: Level of transformation required to support new business strategies

*Source: 451 Research custom survey*

*Q: How would you rate the level of transformation required in your organization's IT environment to support new business strategies over the next five years?*

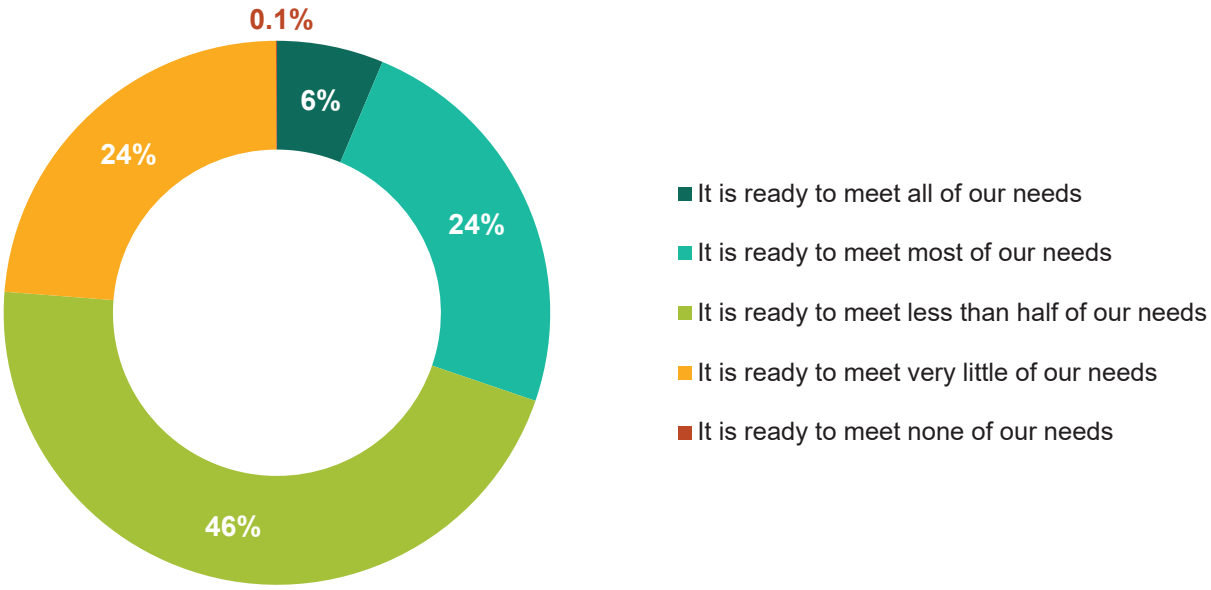
*(Single-Select Response; n=1,805)*




That concern could be driven by a number of factors. We wanted to understand how current and future infrastructure needs were contributing to this level of concern. While transformation is a measure of future work required, we needed to get a deeper understanding of the current state of infrastructure. To that end, we asked about the readiness of infrastructure to meet modern-day business needs. This is less forward-looking than the transformation question, but it should align with the amount of work that respondents indicated would be needed.

Figure 7: The ability of IT infrastructure to meet modern-day business needs

*Source: 451 Research custom survey*
*Q: To what extent is your IT infrastructure ready to meet modern-day business needs? (Single-Select Response; n=1,805)*




The answer echoes the earlier responses in that over 70% indicated that their IT infrastructure was ready to meet less than half of their needs. These two questions correlate well across the study respondents, adding strength to the opinion. The conclusion is that respondents are seriously concerned about how they'll be able to support important business initiatives and about the amount of work that it will take them to change that situation.

# Roadblocks on the Way to Cloud

Some of the difficulties that organizations are facing are caused by the complexity of putting new capabilities to work while maintaining existing application structures. All of the respondents are using hybrid environments, but there are key parts of their application infrastructure that could be holding them back from more efficient use. One of the challenges of hybrid multicloud is ensuring that necessary data and application components can be accessed from new, off-premises infrastructure.

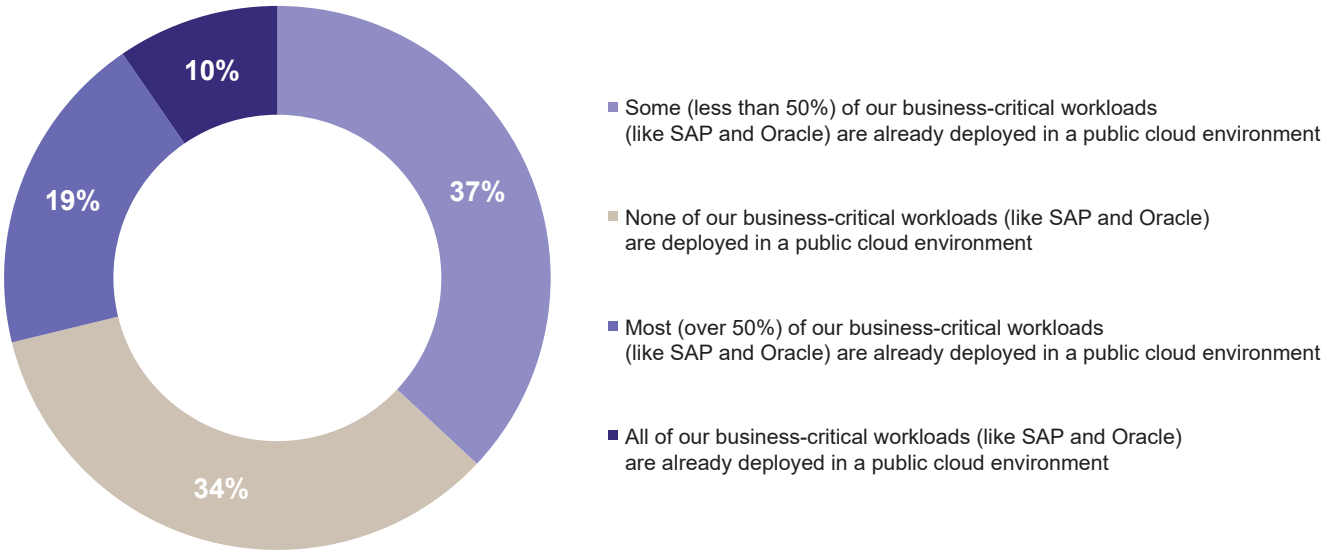
We queried respondents on their progress in placing business-critical workloads in public cloud environments as a way of gauging their progress toward greater use of hybrid infrastructure. Some have been able to make that shift, but just over a third have not moved any of these key workloads. Those that have moved less than 50% (including none) make up 71% of the respondents.

Figure 8: Business-critical legacy workload deployment in specific public cloud instances

*Source: 451 Research custom survey*

*Q: To what extent are your business-critical legacy workloads (such as SAP or Oracle applications) already deployed in specific public cloud instances (do NOT include transitions to new databases or to SaaS-based applications such as Salesforce or Workday)?*

*(Single-Select Response; n=1,555)*



One of the difficulties of planning in turbulent times or in situations where the future is uncertain is that it can be difficult to justify significant investments. Moving a key workload is a significant investment for any organization in both cost and risk. As we'll see later, security is always a concern, and it can be even more so with new and less-understood technologies. Regulatory and compliance issues also need to be addressed. This places organizations in a difficult situation when working to make hybrid multicloud environments more capable and efficient. There's concern that taking workloads like databases off-premises might not be worth the effort, and yet, without performant access to data, development in those off-premises resources will be constrained. In order for organizations to transform, the expectations that drive planning need to be transformed as well.

# Transforming People, Processes and Technology

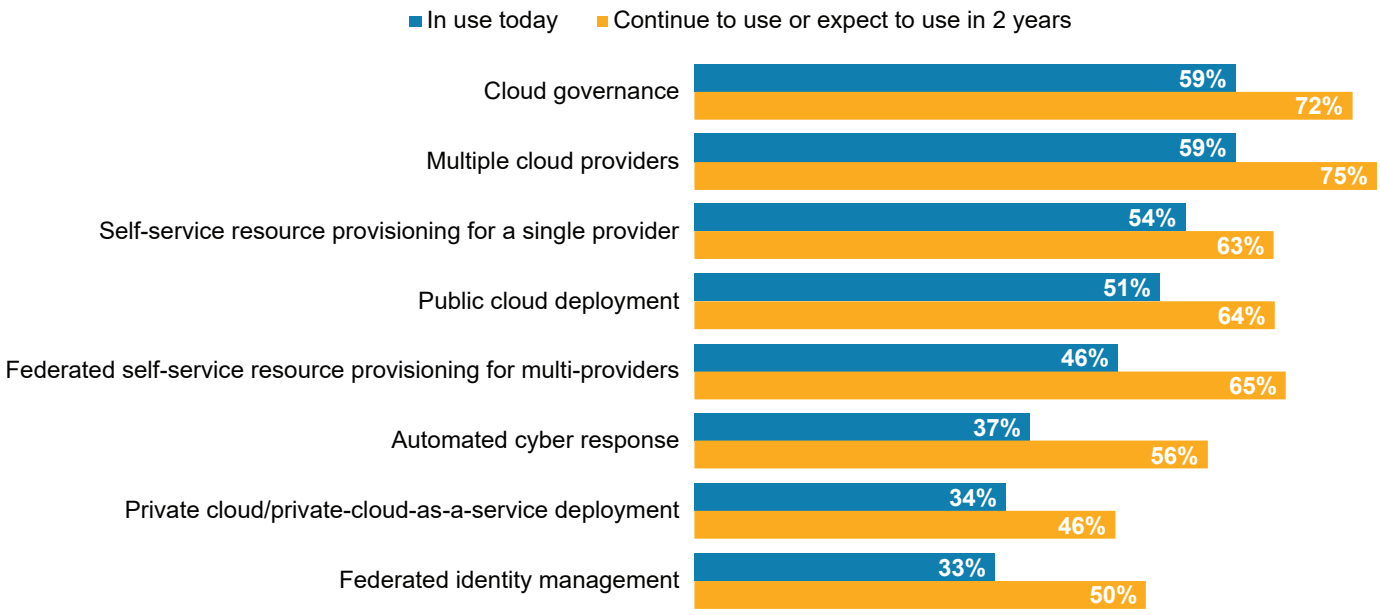
In the survey, respondents indicated that they expect to move toward better ways of managing their infrastructure; their interest in cloud-native patterns (Figure 3) and the business initiatives in Figure 5 are both aimed at transforming their operations. Changes in technology and shifts in business ecosystems have been driving different requirements for infrastructure for a number of years already. Application architectures have been moving from traditional tiered models to systems that are much more interconnected. The ecosystem of the modern web property has expanded dramatically, pulling in CRM and marketing feeds and building out online marketplaces. By its nature, this expansion creates hybrid deployment styles, but it doesn't always shift the management systems that maximize efficiency and productivity.

To better understand changes in management systems, we asked respondents about the high-level capabilities they have in use and how they expect to expand over time (Figure 9). Three capabilities stood out as those that respondents expect to grow the most dramatically: automated cybersecurity response (19-point increase in use in two years), federated provisioning of resources (18-point increase) and federated identity management (17-point increase). Automation for security operations is something that many organizations are pursuing to address the chronic staffing challenges in security teams.

The other two capacity improvements can be directly tied to the complexity of hybrid multicloud environments and confirm the management complexity perspectives indicated in Figure 4, where we looked at the number of management systems that were in place. Organizations need to be able to standardize the way in which their infrastructure is consumed to reduce operational friction and increase the speed of development and innovation. Federating provisioning across multiple providers can make this possible. At the same time, federated identity management is necessary to enable this improvement to ensure that the appropriate resource controls are able to span the full breadth of hybrid multicloud environments.

Figure 9: Capability expansion

*Source: 451 Research Custom Study*
*Q: Which of the following capabilities does your environment offer today? (Multi-Select Response; n=1,805)*
*Q: Which of the following capabilities will your environment continue to offer or begin to offer in two years? (n=1,805)*




We looked at how respondents expect the transformation of their infrastructure to happen, as well as the impacts. The first area that we examined was application development patterns (Figure 10). Adoption of a DevOps pattern can be an indication that an organization is shifting the principal way in which it creates value for the business. It can also be a significant investment.

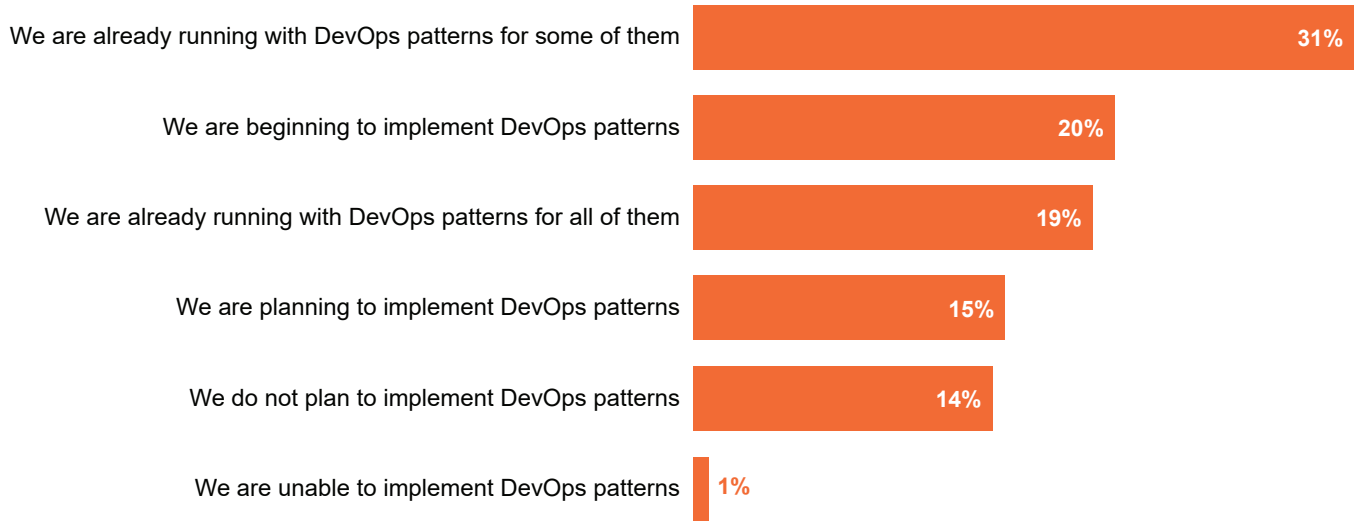
Just under a third (31%) are using DevOps and CI/CD patterns for some of their applications. Another 35% have efforts underway. This kind of early use can often be supported by extensions of existing resources. Organizations need to be aware of the demands that high-velocity processes like DevOps place on infrastructure. To support DevOps at scale, they'll need to dramatically reduce the amount of staff work required when compared to traditional processes. There are simply too many activities created by the much shorter life spans of DevOps workloads to attempt to support them with techniques designed for the past.

Figure 10: DevOps readiness

*Source: 451 Research custom survey*

*Q: Which statement best describes your environment's readiness for DevOps/CICD (Continuous Integration/Continuous Delivery) for your production applications?*

*(Single-Select Response; n=1,805)*



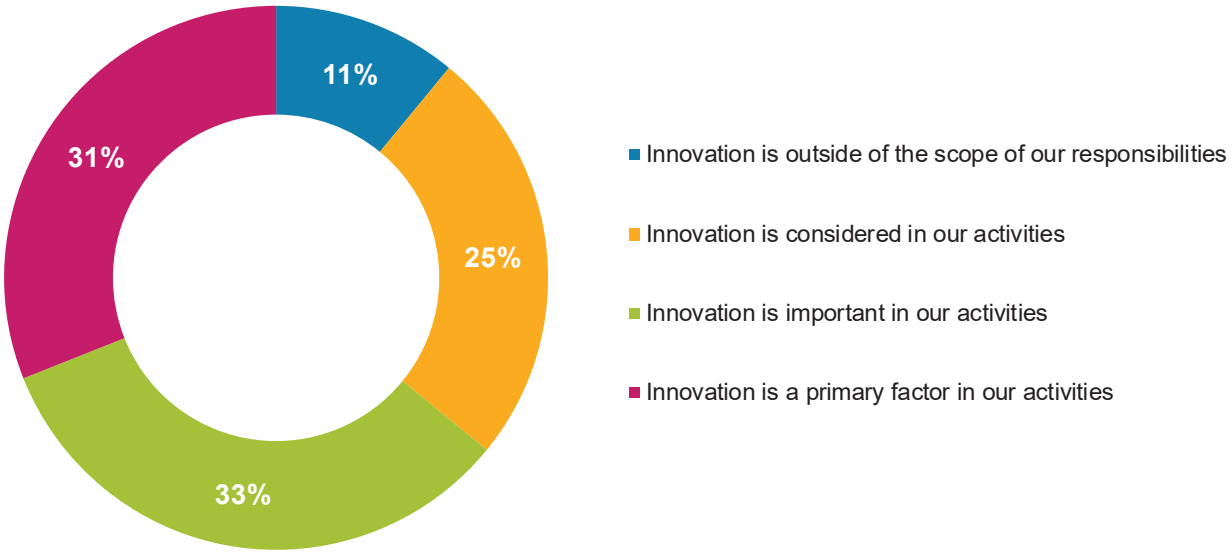

As organizations look to address the speed of resource provisioning that DevOps patterns require, they're identifying containers as a way not only to provide a standardized resource for development teams, but also to manage infrastructure with greater granularity and pace. Expectations for API-driven orchestration are a key driver, as well. The promise is that automation can help to address the higher levels of activity driven by container-based infrastructure. Many organizations have skills shortages not only in container operations, but also in automation.

Automation can be an effective force multiplier for existing teams and has become a prerequisite for successful, scaled-up DevOps management. It has additional benefits in resilience and security. The reduction of toil that automation brings can also minimize human error. The consistency and repeatability that automation establishes can simplify security operations through the reduction of special-case deployments that require differing security policies.

There is an additional benefit of automation and the shorter provisioning times that a DevOps focus can bring. Reducing the cost of experimentation can open the door to innovation. Increasing innovation was the leading reported business imperative, and one that lies at the heart of an important insight in this study.

Figure 11: Role of IT in enabling innovation

*Source: 451 Research custom survey*
*Q: Which statement best describes the role IT plays in enabling innovation in your organization? (Single-Select Response; n=1,805)*




Just under a third of respondents said that innovation is a primary factor in their activities (Figure 11). Some 11% said that innovation is outside of the scope of their responsibilities. While innovation is often an important priority, in some organizations, IT teams aren't engaged to foster its enhancement.

The important insight in this data came from correlating innovation with the perceived readiness of IT infrastructure to support modern business needs. For those that reported their infrastructure was ready to support all of their business needs, innovation was a primary factor in their activities. Granted, this was only 6% of all respondents, but it's an indicator that considering innovation in IT operations could lead to creating a better foundation for the future of the business.

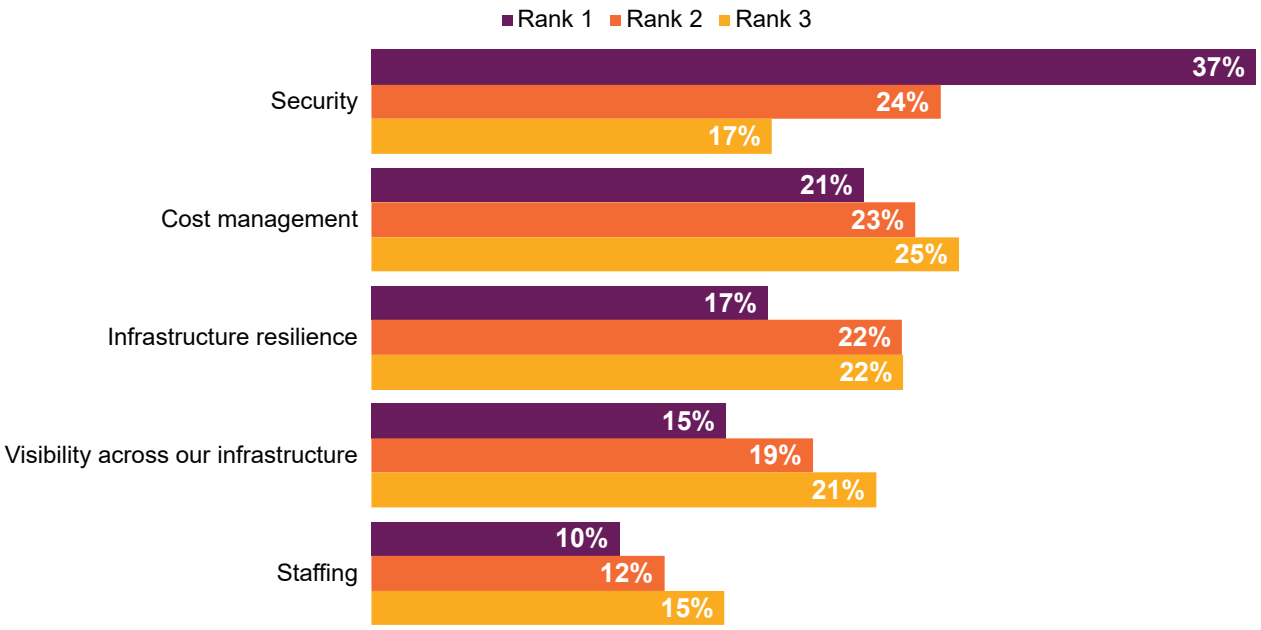
# Transforming Security

The leading management challenge reported in the study is security, well outpacing others (Figure 12). There are many issues that could be driving security concerns, and the complexity of hybrid multicloud infrastructures is certainly among them. Organizations need to ensure that, as part of their broader transformation efforts, their security capabilities are transformed as well.

The transformation of security is fundamentally increasing the visibility and controls available in ways that can support the expanded scale and scope that hybrid multicloud presents. New off-premises resources need to be managed in ways that can support the same level of operational telemetry generated on-premises. At the same time, new types of telemetry that can provide greater detail and context need to be integrated into security operations.

Figure 12: Largest IT infrastructure challenges

*Source: 451 Research custom survey*
*Q: What are the largest ongoing challenges that you face in managing your IT infrastructure? (n=1,805)*




Dealing with the speed and scale of security in hybrid multicloud environments is a concern that was illustrated in Figure 9, where automated cybersecurity response capabilities garnered the expectations for the highest level of expansion. Automation can be a force multiplier for already taxed security teams. The speed with which the current threat landscape is evolving and the larger attack surface that hybrid multicloud environments present have put an emphasis on the speed of threat response.

That chart also shows the importance of another security capability, cloud governance. While its level of growth isn't expected to be as high as automated response, it's already in much greater use, being tied in the top spot with the use of multiple cloud providers at 59%. The other security-related aspect of Figure 9 is federated identity management. Respondents saw this as the third-fastest area of expansion, and it can be a key component of reducing security complexity by creating a unified view of identity.

The nature of hybrid is that organizations have more assets in more places. Effective management can help to secure those assets and address concerns around cost and resilience. It's a process of maintaining situational awareness even when infrastructure extends to the clouds.

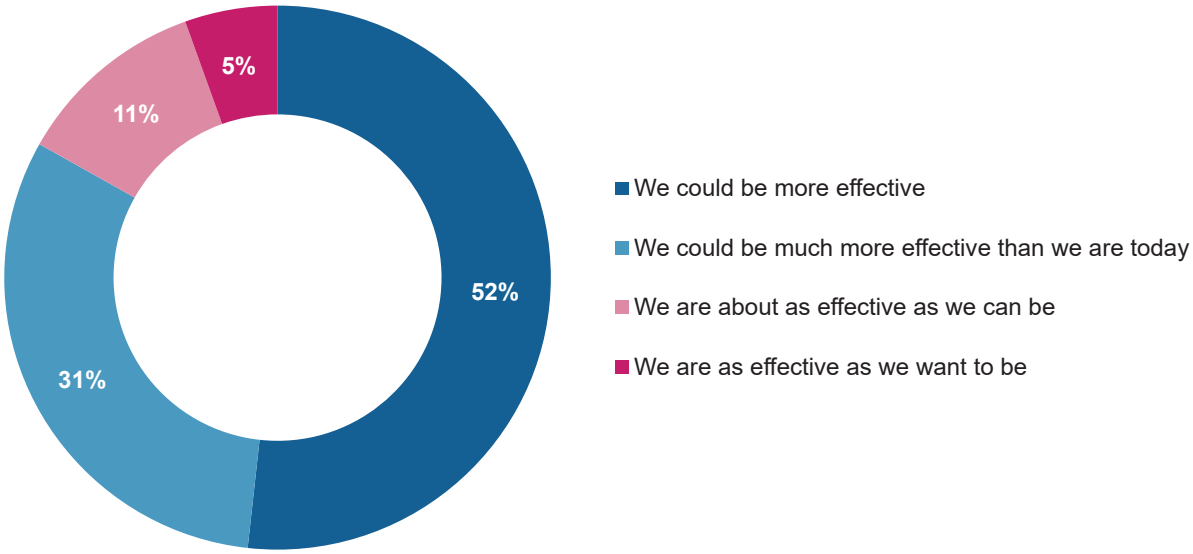
# Expectation for the Path Forward

The organizations in the study were well aware of the limitations of their current environments, even though their use of hybrid infrastructure puts them toward the front of the pack in operational maturity. We asked respondents to identify how effectively they believe their infrastructure is being managed, and 83% said that they could be doing better (Figure 13). About a third (31%) felt that they could be much more effective than they are. That's a useful level of awareness that ought to drive them to improve their management systems.

Interestingly, where just 5% said that they were as effective as they wanted to be, 11% said that they were as effective as they can be. This subtle difference is a reminder of previous responses that mentioned limitations in business processes and skills that could be holding some back from managing their infrastructure more effectively. The answer shows that they're aware that some limitations will be difficult for them to overcome and will cap efforts to increase their management effectiveness.

Figure 13: Effectiveness of IT infrastructure management

*Source: 451 Research custom survey*
*Q: How effectively do you feel that your IT infrastructure is managed today? (Single-Select Response; n=1,805)*

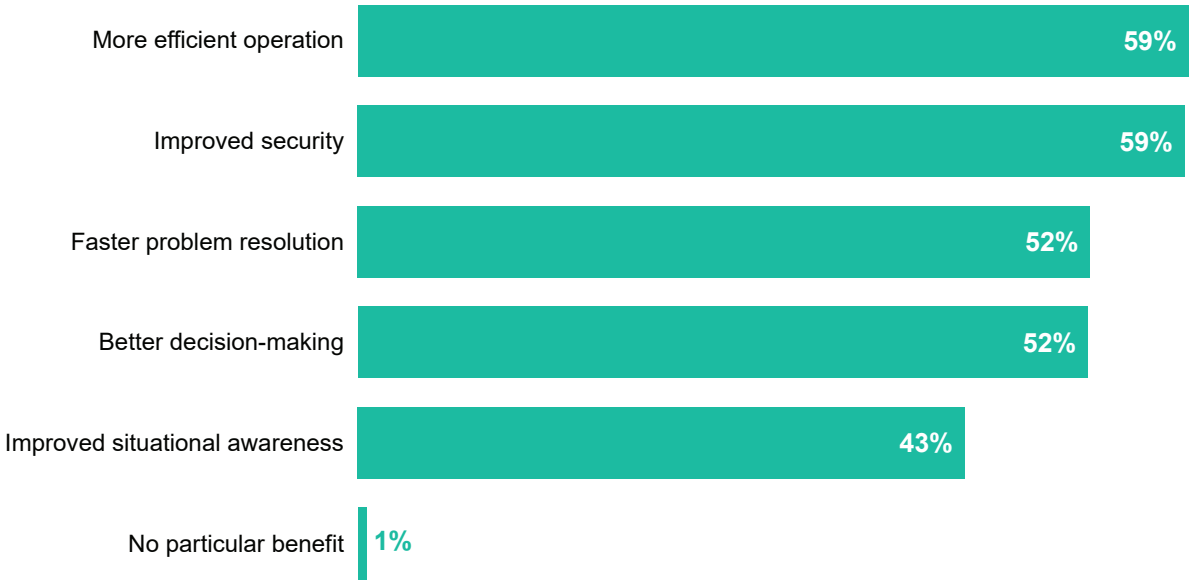



There are different ways in which organizations can improve their level of management effectiveness in hybrid multicloud environments. We've identified improving automation as a way to address scale and security, and there are two others that are important to note: the integration of management systems and the adaptation of tool chains that support development and operations. These two improvements are interconnected. A lack of integration creates management islands that require their own specialized skills. The tool chains that consume infrastructure depend on the management systems that run that infrastructure. As we discussed in the section surrounding Figure 10, these are the kind of improvements that organizations need to have in place to fully benefit from the gains that DevOps and CI/CD operational patterns can offer. Integrated management systems can present a simplified interface for tools by making operational differences between different resources transparent.

Integrating management systems can have several benefits, and we asked our panel about their expectations. Greater efficiency and security improvements were tied for the highest expected value (Figure 14). Efficiency improvements can help organizations deal with the demands for increased scale and scope that hybrid multicloud operations present.

Figure 14: Benefits of a consolidated view of IT infrastructure

*Source: 451 Research custom survey*
*Q: What benefits would you attribute to a single, consolidated view of your IT infrastructure? (Multi-Select Response; n=1,805)*




Improvements in security can be driven by a pair of factors: increased visibility and normalized controls. The greatest impact increased visibility can have is to correlate activity across resources more efficiently. If analysis has to take place in isolated environments, critical relationships and common links could be missed. Managing effective security policies across hybrid environments can be tremendously complicated and error-prone, leaving gaps open to exploitation, if done independently. Integrated management can normalize the different security controls and allow unified policy management and posture assessment.

Adapted tool chains can offer both a wider range of options for developers and a unified view of available infrastructure. They can also ensure that all parts of available resources are put to work, increasing resource utilization and reducing waste. The effective capacity gains delivered by more effective utilization can yield considerable cost savings.

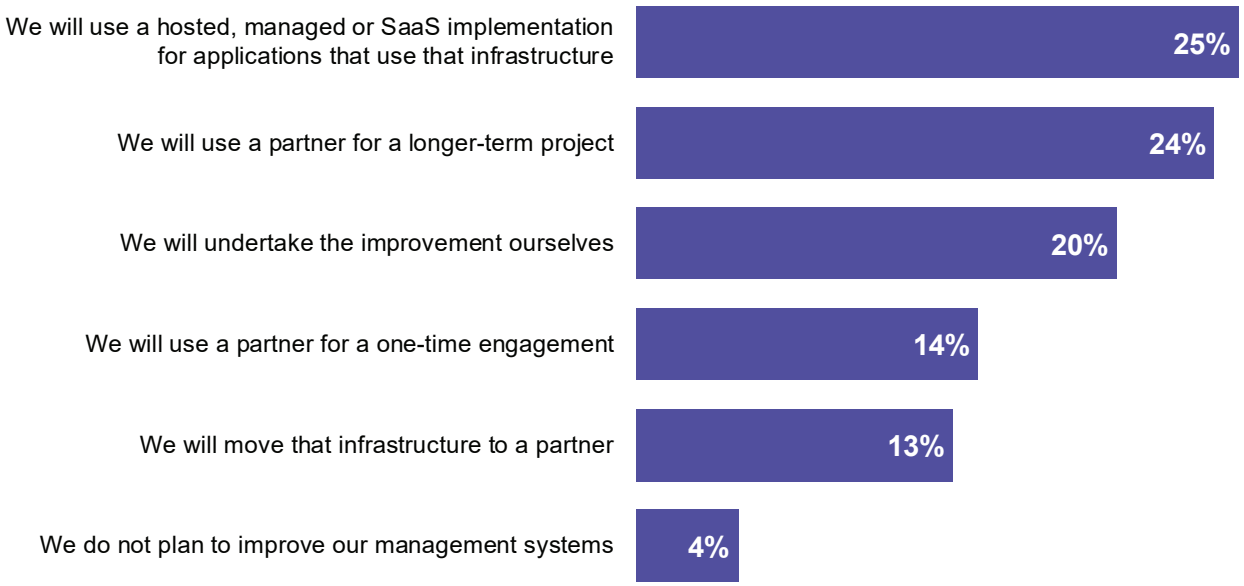
The benefits of these improvements don't accrue solely to the IT and development teams who have direct contact. Integrated management creates a shared repository for operational data across the infrastructure. Without it, operational data exists in isolated pools, creating difficulties in understanding costs and operational trends. With integration, CIOs, operations VPs and CFOs can build a stronger perspective on the important aspects of how the foundation of their business is performing. Development teams can gain insight on performance and utilization and improve optimization strategies.

# Expectations for Partners

Undertaking the changes that the respondents identified represents significant work. These changes are important and critical to organizational success and may be complicated to achieve as an entirely internal effort. This is the sentiment represented by a question in Figure 15 on how members of our panel expect to modernize their capabilities. A full 76% said they expect to leverage a partner as part of their improvements. By a slight margin, the largest number of those indicated that they expect to improve business functions by moving to hosted, managed or SaaS environments. This has been a familiar path for sales and CRM applications but might not be available for more specialized applications.

Figure 15: Plans to improve management

*Source: 451 Research custom survey*
*Q: What are your plans to improve the management of your IT infrastructure? (Single-Select Response; n=1,805).*




The second and fourth options are different approaches to building on partner benefits. A longer-term project can help an organization to build its capabilities over time, where there is an expectation that they'll eventually take control. Using a partner to manage infrastructure can let organizations focus on core business value while the partner deals with operational or technical details that aren't competitive differentiators.

Only 20% felt that they would do the work themselves, an indication that there is a reasonable understanding of the work needed to be done, as well as an understanding that an outside perspective could present options that might not have been considered internally.

# Conclusions

More efficient and effective management operations can help organizations address the critical business challenges that they face. Being able to drive business imperatives in this more dynamic world requires managing a complex and dispersed infrastructure that's necessary to support those imperatives. Doing so will require capabilities to operate at greater scale, with more flexibility and with an ability to adapt to whatever twists and turns the future brings. To manage at this level, organizations will need to move beyond legacy approaches and leverage abilities that will take their IT teams to the next level. It's a transformation that can be accelerated by pulling in expertise and boosting skills by putting new technologies to work effectively. It's a change that's necessary and one that needs to happen now.

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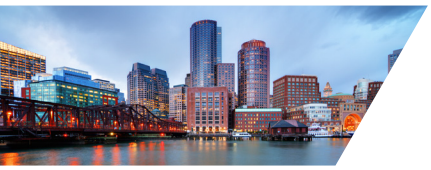

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