

451

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BLACK & WHITE PAPER

The Future of IT Ops is Autonomous

COMMISSIONED BY



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MAY 2019

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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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Previously, Nancy wrote about a wide range of technology subjects, both on staff for a variety of publications and on a freelance basis. She has covered everything from the switch to digital cellular communications to the emergence of cloud computing. Her writing has appeared in The New Stack, Wired, MIT Technology Review, The Economist (Babbage blog), Computerworld and The New York Times.

Executive summary

Businesses of all kinds – large and small, young and old, and in modern and traditional industries – are employing software in more ways than many could have imagined even a decade ago. Software applications and services support the myriad ways their customers prefer to interact with them and enable internal constituents to meet critical business goals.

As such crucial building blocks for the business, software and services must perform well. The consequences to poor performance or outages are significant, including the loss of customers and revenue. Yet ensuring top performance is more challenging than ever. That's because most businesses are adopting a range of new technologies that allow them to quickly respond to customer demands with additional capabilities introduced regularly.

These new technologies, while delivering important functions, also create new challenges when it comes to IT operations. Technologies such as containers, serverless environments, orchestration tools, microservices architectures and others add significant complexity to application environments. Add in the legacy workloads that play important roles in delivering services, and the process of identifying the cause of and solving problems becomes more difficult than ever.

This new reality demands new approaches to IT operations and performance management. Traditional or legacy tools don't hold up. They're unable to handle the volume of operations data generated by modern environments. They're also unable to surface intelligence about the root cause of performance problems in these complex environments, which will likely only grow more complex for the foreseeable future.

However, new technologies and approaches are emerging that are proving valuable to managing IT operations and incident response. Technologies that centralize the insight that is potentially collected by many monitoring tools about complex application environments and that embrace sophisticated analytics techniques such as machine learning (ML) support the demands of modern, hybrid applications. With such reliable intelligence at hand, users can finally confidently embrace automation in ways that much improve the time it takes to solve problems. Over time, as users and enterprises experience the benefits of automation, IT operations will be able to move from automating simple tasks and use cases to a more autonomous mode of operation.

Businesses with complex IT environments that don't embrace technologies such as AI/ML and automate their operations are unlikely to be able to quickly address performance problems, resulting in services with poor performance – or worse. Customer loyalty and employee efficiency depend on these applications, and the consequences of software that doesn't meet their expectations include lost business and productivity. However, modern and modernizing businesses that do adopt these new approaches can ensure that their software and services deliver the kind of performance that retains, serves and attracts important end users and customers.

Modern IT Environments Create New Challenges for Operations Teams

IT teams in modern or modernizing businesses are facing change in terms of the technologies they employ, the way their teams are organized, and the kinds of work they're being asked to do. All of these factors create new challenges when it comes to incident response and supporting the level of application performance that the business and users demand. These are among the sources of notable new challenges for incident responders.

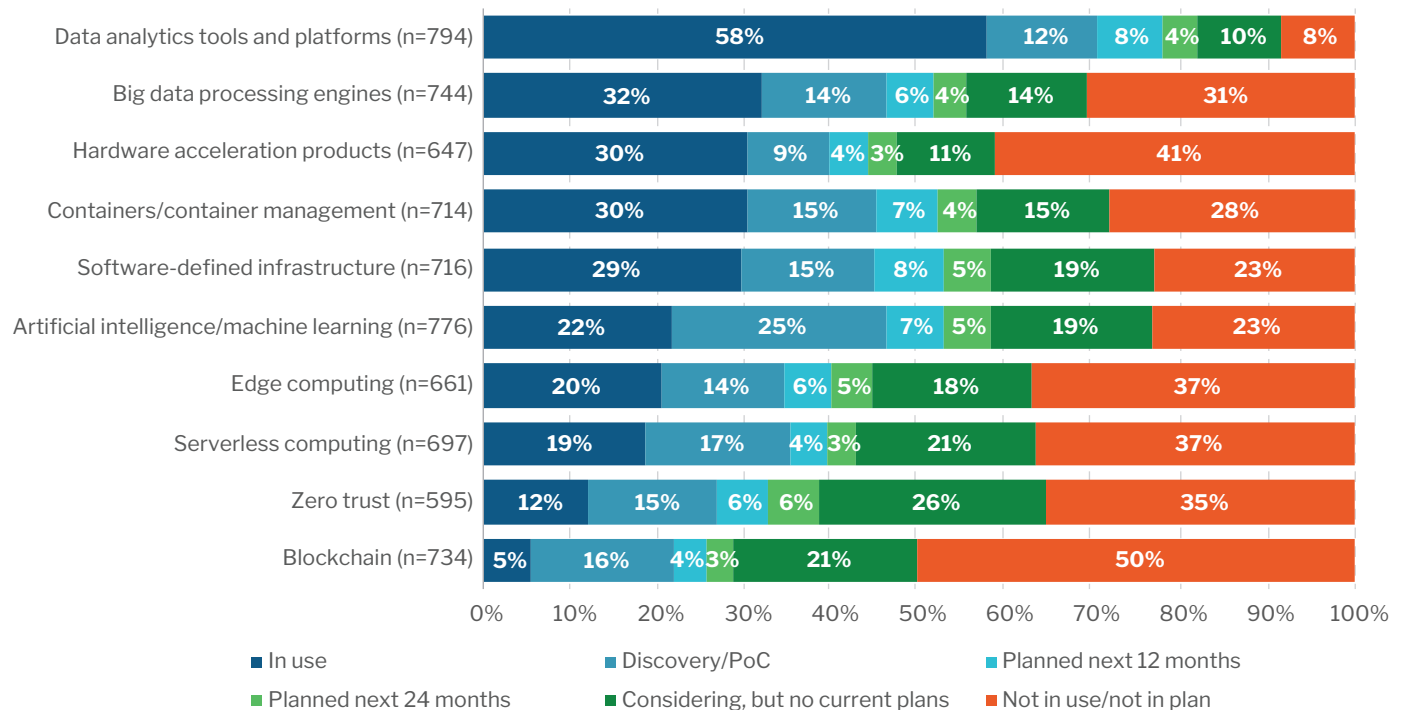
Modern Technology

Technologies such as containers and cloud allow organizations to move fast, iterating their applications to meet these demands. Our research finds that businesses are embracing a host of new technologies, including those that result in increasingly complex and dynamic IT environments. In a recent survey, 56% of IT decision-makers said that they were using, planning to implement or evaluating containers. Forty-three percent are similarly using or planning to use serverless technologies.

Figure 1: Broad adoption of new complex technologies

Source: 451 Research's Voice of the Enterprise: Digital Pulse, Budgets and Outlook 2018

Q: Please describe the level of usage within your organization for each of the following technologies.



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While these technologies serve important business and IT goals, including allowing development teams to more quickly iterate, they also create new problems when it comes to operations. Containers, for instance, may be short-lived, yet operations professionals must be able to identify the source of a problem, even in a container that's no longer operating. A containerized application will employ scores of containers, each emitting operations data and alerts, requiring not only the collection of exponentially larger volumes of data but an understanding of how alerts are related. Legacy monitoring tools typically can't aptly support this environment. In short, while these modern technologies have benefits, they also create new challenges for operations and incident response.

The Rise of Hybrid Environments

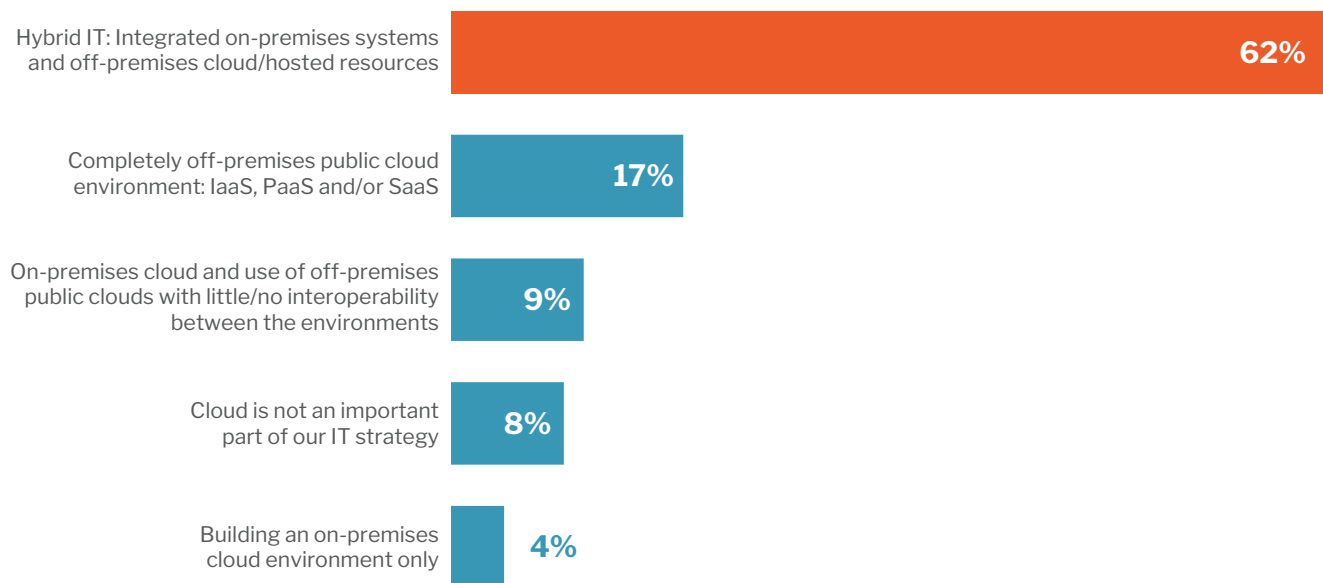
These modern technologies are being deployed across a range of execution venues, adding to application complexity. We've found that a strong majority of IT decision-makers expect to be hybrid, with 62% planning to support an integrated on-premises and off-premises IT environment and an additional 9% expecting to run workloads in both environments without integrating them. Seventeen percent expect to be entirely off-premises, with some portion of those organizations embracing several environments including IaaS, PaaS and SaaS. Only 8% of respondents said cloud wasn't an important part of their IT strategy, positioning cloudless organizations as the distinct minority.

That means 88% of IT decision-makers in our survey likely operate in a hybrid or multi-cloud environment. While there are many benefits to employing hybrid and multi-cloud approaches, doing so also contributes to operational and performance management challenges, with many organizations struggling to achieve visibility across hybrid environments.

Figure 2: Overall IT approach and strategy

Source: 451 Research's Voice of the Enterprise: Digital Pulse, Budgets and Outlook 2018

Q: Which of the following best describes your organization's overall IT approach and strategy?



% of respondents (n=916)

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Legacy Tools Will Continue to Serve Many Businesses

These challenges are exacerbated by legacy or traditional workloads that we expect to run for quite some time. Such systems often can't be efficiently moved to modern environments or don't significantly benefit from cloud-native technologies. Many organizations we talk to have developed their own tools for managing the performance of these workloads, or they employ legacy tools that continue to support their operations.

However, these legacy workloads don't run in a vacuum. They most often work in tandem with new applications and services that are built with more modern technologies. Siloed visibility into the operations of the legacy workload often isn't useful in troubleshooting and solving performance problems of hybrid applications. The result is these organizations demand new tools and processes that offer a unified view into these complex, hybrid environments, and that enable smooth incident response when performance problems occur.

IT Teams are Being Tasked to Do More with Less

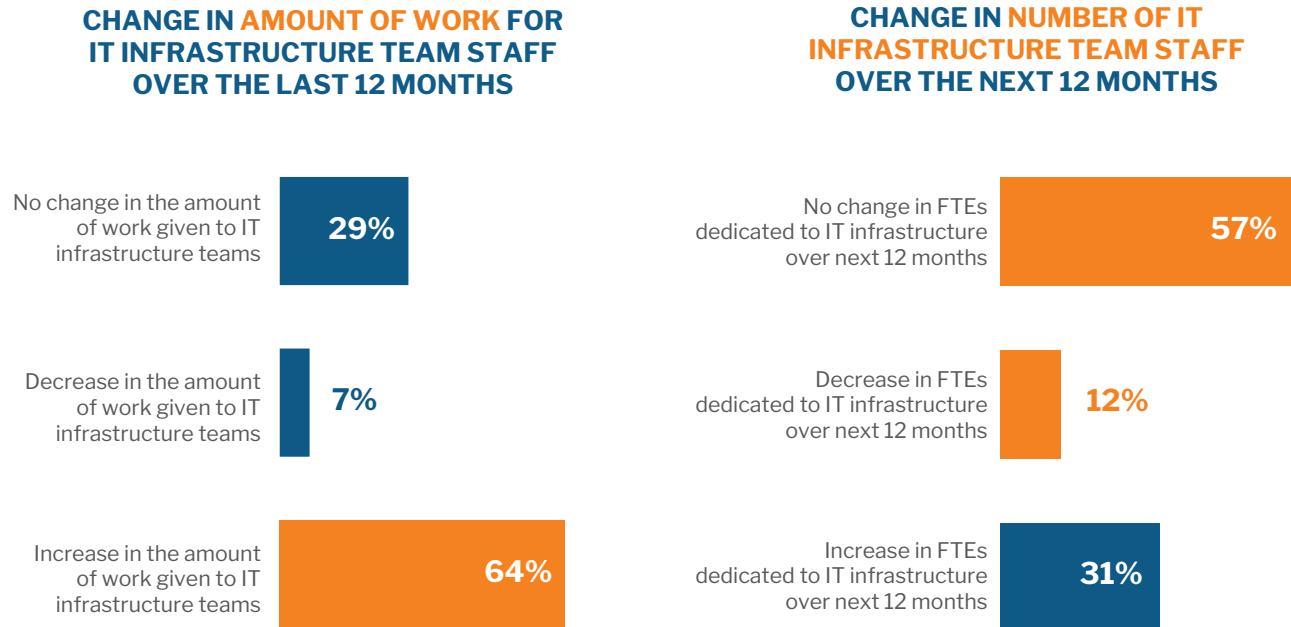
We asked IT infrastructure teams about the amount of work they were tasked with handling, and 64% said that it had increased over the past year, yet 57% said the size of their team wouldn't change in the coming year. A further 12% said the size of their team would actually decrease. We also know that organizations that have the budget to hire new staff often can't because they're unable to find people with the skill sets that they require. The pressure to do more with the same team size adds to the challenges that operations teams face.

Figure 3: Changes in IT infrastructure workload and staff

Source: 451 Research's Voice of the Enterprise: Servers and Converged Infrastructure, Organizational Dynamics 2018

Q: Over the past 12 months, has the amount of work given to IT infrastructure teams increased, decreased, or has there been no change? (n=636)

Q: Looking ahead 12 months, do you think you'll see an increase in the number of full-time employees dedicated to IT infrastructure at your organization, a decrease, or no change? (n=609)



Changing Team and Organization Structures

At the same time that IT teams face these human resources challenges, they're experimenting with new organizational models in an effort to support demands for continuously iterating software and services. Some maintain a traditional model with a centralized IT team that may not be skilled at responding to the demands of modern applications. Others have enabled autonomous DevOps teams, given the freedom to operate as they see fit.

These organizational shifts have implications in monitoring and incident response. In some cases, DevOps teams choose their own monitoring tools, with the result being dozens of tools operating in silos companywide. This scenario can create new problems in terms of cost and tool management, as well as create silos of IT operations data that may obfuscate the tricky performance problems that result from adopting modern technologies.

Techniques for Addressing These Challenges

Faced with the demand of ensuring top performance in complex, dynamic environments and without additional human resources, organizations should turn to new technologies and approaches that increasingly are being embraced by successful operations teams. These technologies and techniques support autonomous operations, a key goal that can relieve the pressures modern teams face.

We recommend considering several technologies and approaches.

Correlate data collected across the IT landscape

We hear from enterprises that find themselves with scores of monitoring tools, each collecting IT operations data and retaining that data in silos. This may happen for several reasons, including that new tools are added as new technologies are adopted or because DevOps groups are given the autonomy to choose the tools they prefer.

However, complex environments that embrace modern cloud-native deployments as well as traditional infrastructure require a holistic view of performance. To achieve that centralized view, operations teams are embracing new tools that can analyze data collected across a distributed IT environment. Doing so relieves several pain points, including those associated with alert fatigue, because the tools intelligently and autonomously identify the many alerts that are likely related to a single incident. They can also automatically pinpoint the root cause of the problem and then make suggestions about how to repair it.

These new tools must be as open as possible, able to collect information from virtually any tool a business may employ, including homegrown tools and legacy products. Such openness ensures a holistic understanding of dependencies behind each application and services, addressing the data silo problem that slows down the response to performance incidents.

Employ AI/ML for help with surfacing intelligence from the growing volume of IT operations data generated by a complex, hybrid environment

Complex IT environments generate a volume of IT operations data so large that humans literally can't effectively evaluate it. Vendors are increasingly embracing and developing ML technologies to learn about the relationships across complex IT environments and pinpoint problems and their solutions, and some enterprises are already deploying those solutions. Doing so accurately is a key requirement for enabling automation in incident response.

In fact, our research indicates that IT infrastructure teams expect significant impact by embracing AI/ML, including in ways that can help them solve the problems they face in terms of balancing their growing workloads without new staff. We asked how IT decision-makers would

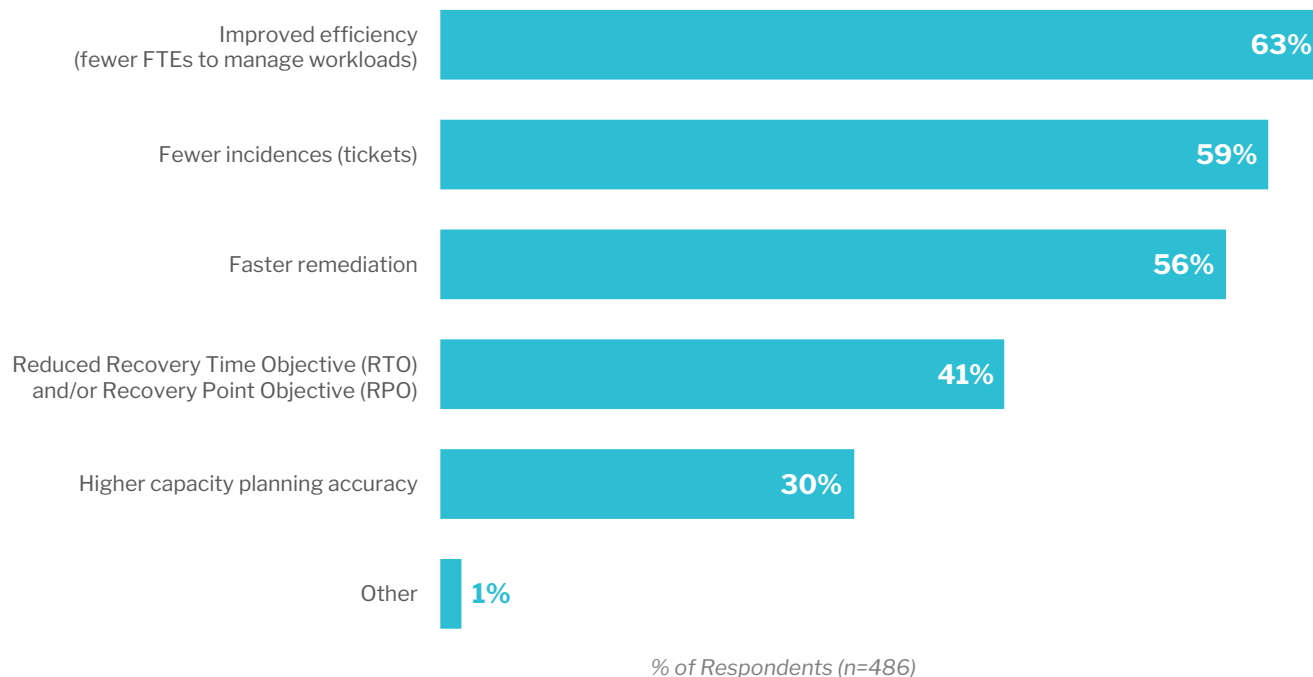
measure the value of AI/ML and, the top response, cited by 63%, was improved efficiency, including requiring fewer full-time employees to manage workloads. Given the skills gap, the growing workload facing IT teams, and lack of budget for added human resources, improved efficiency is a key value derived from machine learning technologies.

The second top response to our question about how respondents would measure the value of machine learning was facing fewer tickets, at 59%, followed by faster remediation, cited by 56% of respondents. These responses are all related to the most painful challenges facing IT operations teams that are tasked with driving performance in complex environments, demonstrating the benefits that teams believe machine learning can bring.

Figure 4: How organizations would measure the value of ML/AI enhancements

Source: 451 Research's Voice of the Enterprise: Servers and Converged Infrastructure, Budgets & Outlook 2018

Q: How would your organization measure the value of machine learning/AI enhancements? Select all that apply.



In addition, our research indicates that broadly speaking, the preferred way of obtaining AI/ML technology is to purchase it built into a product. We think this holds true in monitoring and IT operations, where we don't hear from organizations that want to develop their own AI/ML applications, in part because machine learning development expertise and data science skills are not always easy to acquire. Instead, we find that most organizations want to purchase monitoring and incident response tools that employ AI and machine learning to address particular challenges and solve vexing problems.

Embrace automation to help speed time to resolution

Machine learning has become a key enabler of automation in IT ops. With machine learning in place to accurately analyze increasingly complex IT operations data, teams can confidently enable automation across several incident management functions, including detection, investigation and remediation.

These tools might automate the process of sending a ticket to the right expert, attaching relevant insight about the problem and recommendations about appropriate solutions. In addition, they might feed orchestration and remediation tools, kicking off appropriate responses to accurately identify performance problems. The result is that teams can automate some of the rote work they are sometimes required to handle, freeing up their time to work on more challenging and important problems and projects. As teams' confidence in automation builds, enterprises will be able to accelerate the level of automation and start embracing autonomous operations in different parts of IT operations.

It's clear that IT teams want to embrace automation, although many haven't quite gotten there yet. Our research indicates that while half of IT decision-makers described the level of automation in their environments as mostly manual, a significant portion – 75% – said they plan to increase their investments in automation in the coming year.

Figure 5: Level of automation in IT environment, now and in 12 months

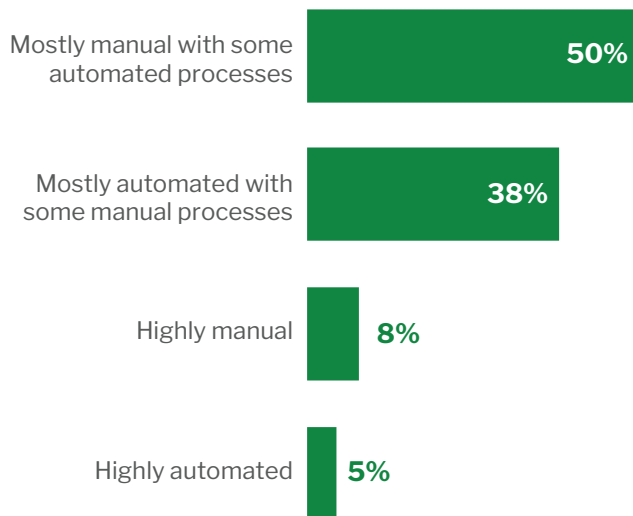
Source: 451 Research's Voice of the Enterprise: Digital Pulse, Budgets and Outlook 2019

Q: How would you describe the current level of automation in your organization's IT environment?

Q: Looking ahead 12 months, do you expect your organization's investment in IT automation to increase, decrease or remain the same compared to the previous 12 months?

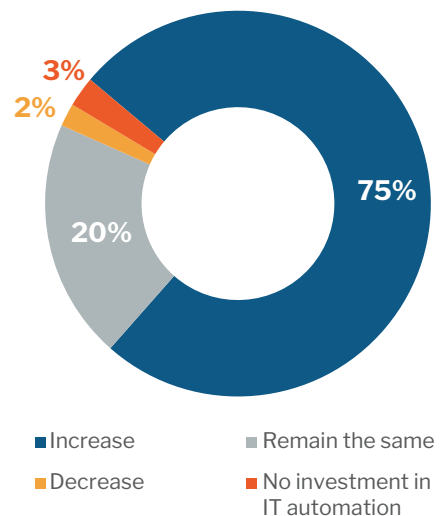
LEVEL OF AUTOMATION IN IT ENVIRONMENT

% of respondents (n=881)



EXPECTED CHANGES IN IT AUTOMATION INVESTMENT IN NEXT 12 MONTHS

% of respondents (n=829)



Consider new approaches to IT team organizational models

We're seeing new models emerge that for some organizations boost incident response efficiency and ultimately overall application and service performance. With the adoption of DevOps practices, many organizations decentralized monitoring and incident response. In some cases, this approach added inefficiencies because they were essentially replicating the functions of monitoring and incident response across multiple teams.

Now, some organizations are finding success by centralizing some performance management functions. For instance, some organizations employ a central team that supports and manages monitoring and incident response tooling, serving as resident experts and offering support to fast-moving DevOps teams. The benefits are many. Not only can these organizations centralize the management of tools, they can establish the central team as experts in getting the most out of those tools and in responding to some types of incidents. Doing so relieves other teams of some of the burden of managing tools and the response to some types of incidents, freeing up experts to focus on furthering important business goals.

Conclusions

Today's complex, modern IT architectures call for modern IT operations tools with strong automation capabilities. Embracing modern approaches to operations and incident response can have profound impacts on IT organizations. New tools and approaches are most commonly adopted to solve painful challenges related to difficulties identifying the source of performance problems and quickly repairing them. Tools that employ machine learning and enable automation, as opposed to traditional, rules-based tools, relieve challenges that occur when teams are inundated with alert storms and struggle to collaborate due to siloed data. In short, modern tools remove much of the tedious work that many team members face and enable the faster resolution of problems.

We've seen organizations take a phased approach to employing automation. By examining existing processes, teams can discover the most repetitive actions they work on and those that take the most time. Some organizations begin by automating these activities, often starting with those that are related to non-business-critical workloads to build confidence in embracing automation techniques. Once they succeed with initial automation applications, they begin to expand to additional and increasingly complex uses, with the goal of automating most predictable tasks, eventually moving toward more autonomous IT operations.

The benefits of autonomous IT operations are particularly valuable to teams that don't have the resources they require and that struggle to find the expertise they need. Such tools can also particularly help teams that are adjusting to the new demands of emerging technologies such as containers and microservices architectures that increase the complexity of application environments. With more capable tools in hand, IT teams have the flexibility to try out new organizational models, empowering some team members to position themselves as performance experts, helping out development and DevOps teams with their most vexing performance issues. While sophisticated, automated or autonomous incident management tools handle the easier tasks, incident response team members can better use their valuable skills. Doing so can help elevate their value to their teams.

We see many organizations realizing the initial benefits of embracing modern operations and incident response tools, and just beginning to understand the higher-level implications. These important implications can help IT teams ensure that they're significantly contributing to the business and successfully shift to being active enablers and drivers of digital transformation.



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