**IBM Cloud**
White Paper

June 2017

# Application Performance Management and DevOps: A healthcare and life sciences perspective

*A research study exploring a path to higher application quality and performance*

IBM

## Contents



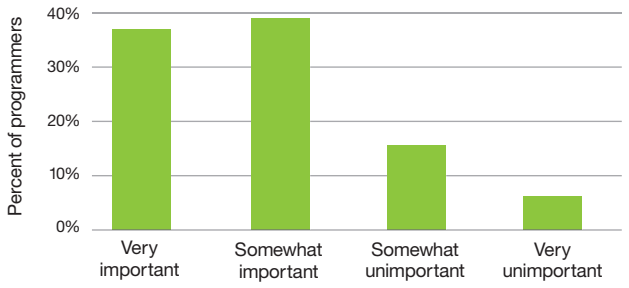
## APM and DevOps: Agile, responsive application development for the healthcare and life sciences industry

While technical and economic factors are transforming all industries, the impact on healthcare and life sciences is especially profound. To streamline economies of scale, large organizations are merging, acquiring and divesting,[1] and the integration of IT systems must follow suit. Companies also grapple with how to handle increasing regulatory requirements while also reducing costs. The surge in electronic health records (EHR) along with the rise in analytics and cognitive solutions requires access and interoperability across disparate systems. Sophisticated consumers demand greater access to records—and increasingly telemedicine—from remote devices. Under budget pressure, companies seek more economical cloud-based technology solutions.

Technology is driving innovation that would have been unimaginable even a decade ago. IDC predicts that:

- By 2019, 60 percent of healthcare applications will collect real-time location data and clinical Internet of Things (IoT) device data and embed cognitive capabilities to discover patterns, thereby freeing up 30 percent of clinicians' time.
- By 2019, seeking a passive way to measure patients' vital signs and other biometrics, more than 40 percent of healthcare organizations across the world will use IoT-enabled biosensors.
- By 2020, care plan adjustments will be made in real time with cognitive/artificial intelligence using data from wearable devices, resulting in 20 percent more patients being engaged in their health.[2]

**How important is DevOps to your overall digital strategy?**




Source: Global Development Survey: Vol. 1, © 2016 Evans Data Corp., Date published: 05/31/2016.

*Figure 1*: A combined 76 percent of developers polled across industries consider DevOps to be very or somewhat important to their future.

Creating and adopting emerging technologies and keeping pace in a competitive industry requires iterative, responsive development cycles. By incorporating both DevOps and end-to-end application performance management (APM), healthcare and life sciences companies can realize substantial benefits, including enhanced application customization, insightful data analytics and heightened customer satisfaction. In short, better care at a better value.

*DevOps* is a vital component of digital transformation. In fact, a recent study by Evans Data Corporation illustrates the importance of DevOps, with a combined 76 percent of the developers polled across industries considering DevOps to be very or somewhat important for their future (see Figure 1).[3]

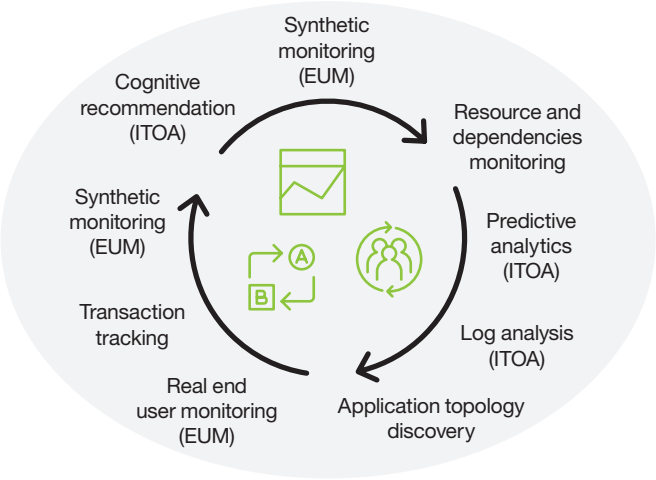
From a process and tools perspective, DevOps breaks down the barrier between development and operations to help deliver three key value propositions, including:

- Accelerating the delivery of innovation with frequent application updates (daily, weekly and monthly)
- Facilitating reduced operational costs of delivering releases — costs that have traditionally hindered agile delivery
- Engaging directly with the user base to align limited development resources with high-value efforts

On the *APM* side of the equation, such tools were traditionally focused on production operations. But as more organizations adopt DevOps models, APM tools and capabilities (as shown in Figure 2) are expanding from operations into development. Dev/Test environments now bear close technical resemblance to production environments, which makes APM easier to expand and implement. This helps enable development to take advantage of traditionally production-oriented APM capabilities such as:

- Low overhead and reduced cost monitoring
- Management of complex dependencies and end-user experience
- Highly scalable and flexible deployments with effective collaboration across development and operations

As one chief information officer (CIO) summarized, "You're increasing productivity because you're giving the users their applications faster. You're reducing IT resources and getting more things done."




Source: Research study data provided by IBM Market Development & Insights.

*Figure 2.* As more organizations across industries adopt DevOps models, these APM tools and capabilities are expanding from operations into development.

Note: ITOA = IT operations analytics, EUM = end user monitoring

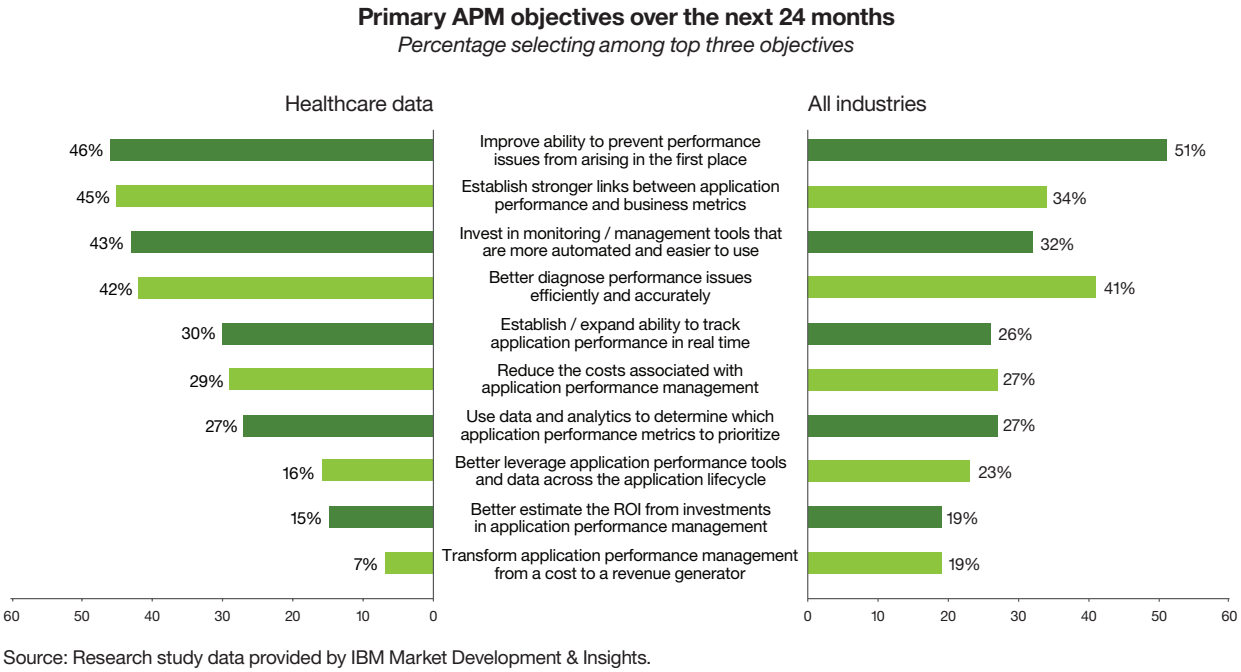



*Figure 3.* Respondents cite a range of objectives for implementing APM solutions over the next 24 months.

## A global study: Investigating current and future APM and DevOps adoption

To explore the influential role that APM and DevOps play in an organization's digital transformation, IBM conducted a global study regarding adoption and usage patterns and impact. The study involved a web survey of 519 participants spanning the DevOps lifecycle, residing in both the IT department and/or lines of business. Respondents were also responsible for at least one application and/or were involved in DevOps practices and methods.[4]

Healthcare and life sciences organizations comprised 54 of the 519 participants. This paper outlines key research findings across all industries and highlights areas in which healthcare and life sciences companies diverged from typical cross-industry responses.

### APM solutions: Who's accountable?

About a third of cross-industry respondents say that both production and application Dev/Test roles assume responsibility for APM solutions. Predictably, these roles fall within traditional lines, with APM for application Dev/Test managed by development roles and APM for production environments managed by operational roles. Respondents anticipate a merging of these APM roles, with the gap between development and operations narrowing over the next two years. This finding reflects the increasing synergies throughout the DevOps process.

Compared to cross-industry respondents, healthcare and life sciences organizations are more likely to involve application developers in application performance monitoring and

management (65 percent versus 41 percent) and less likely to involve at least one operations role (54 percent versus 81 percent). The lower level of operations involvement is likely due to the industry's trend toward integrating diverse systems—a strategy that requires higher levels of development.

When it comes to purchasing APM tools, the function across industries is more centralized. Senior executives make the purchase decisions, with both development and operations managers influencing direction.

## Primary objectives for APM: Preventing performance issues and much more

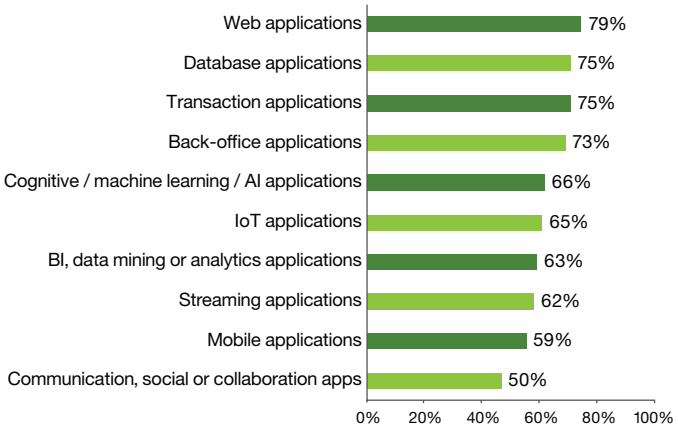
When asked about their primary objectives for implementing APM solutions over the next 24 months, over half (51 percent) of cross-industry respondents state that preventing application performance issues from arising in the first place is key. As shown in Figure 3, healthcare and life sciences organizations report this same concern at a marginally lower rate (46 percent). These companies exceed cross-industry trends in wanting to establish stronger links between application performance and business metrics (45 percent versus 34 percent). Because healthcare and life sciences organizations tend to get greater feedback from end users, they often prevent performance issues from arising in the first place. And the economic pressures on the healthcare and life sciences industry are driving the focus on business metrics.

## Investing in automated, easier-to-use APM tools

Most companies across industries have tools that alert them to application performance issues in production. Some also use dashboards that monitor real-time status and historical trends. In this scenario, proprietary vendor tools are usually used about 74 percent of the time, with just 40 percent of respondents stating they use open source tools. Healthcare and life sciences organizations stand out in their greater propensity (58 percent) for using open source tools. This speaks to the industry's trend toward integrating systems—a priority that requires technology that is relatively easy to modify and customize.

**Type of applications for which APM tools are currently used across industries**

*Percentage selecting, among companies using APM tools & applications*




Source: Research study data provided by IBM Market Development & Insights.

*Figure 4.* Types of application for which APM tools are currently used across industries. On average, companies use APM tools for 70 percent of their applications.

Compared to cross-industry respondents, healthcare and life sciences organizations are more likely to:

- Consider/explore predictive analytics tools that can foresee potential application performance issues so they can be addressed proactively (86 percent versus 73 percent)
- Use diagnostic tools that identify root causes by analyzing an application's log messages (56 percent versus 38 percent)
- Invest in monitoring/management tools that are more automated (43 percent versus 32 percent)

Healthcare and life sciences organizations are *less likely* to use diagnostic analytics tools to identify the root causes of application performance issues by drilling into lines of code (13 percent versus 31 percent). The industry's preference for analyzing log messages as opposed to lines of code reflects the customized, open source nature of their IT systems, in which log messages are easily embedded into applications.

In healthcare and life sciences, as well as across industries, current APM tools are used to monitor web, database, transaction and back-office applications (see Figure 4) not only in production, but also in pre-production Dev/Test.

### Analytical tools for APM: Organizations are ramping up

**Seventy percent of cross-industry participants say the most critical feature of an APM solution involves analytics tools that diagnose application performance issues, yet less than 40 percent of companies used such tools at the time of the survey.**

**With 60 percent of those surveyed exploring analytics capabilities for their APM solutions, this should shift dramatically. The top APM objectives for the next 24 months are analytics related, with the goal of identifying and resolving application performance issues.**

*"You've coded an important application that's supposed to do an important piece of work for the company, which means revenue gained or revenue lost. Absolutely, time to market is accelerated. The quality of service is improved. All important reasons to comply with DevOps guidelines"*

— Mid-level IT manager, 5000+ employees

## The influence of APM on the adoption of DevOps

As organizations manage toward ever-shortening development cycles, performance monitoring throughout all phases of the application lifecycle increases in importance. Almost half of application owners across industries say that the need to use APM solutions earlier in the application lifecycle was an influential factor in their adoption of DevOps practices.

*In fact, healthcare organizations are already more likely to monitor/manage applications in development (92 percent of applications versus 76 percent across industries). And they are more likely to share app performance data across application lifecycle stages (51 percent versus 33 percent).*

Once DevOps was integrated, almost half of cross-industry respondents say the approach has improved the quality of their applications, while also helping to reduce downtime and increase customer satisfaction. Nearly all companies across industries currently use or plan to adopt practices that will drive increased alignment between development and operations, including end-user feedback and continuous application performance monitoring.

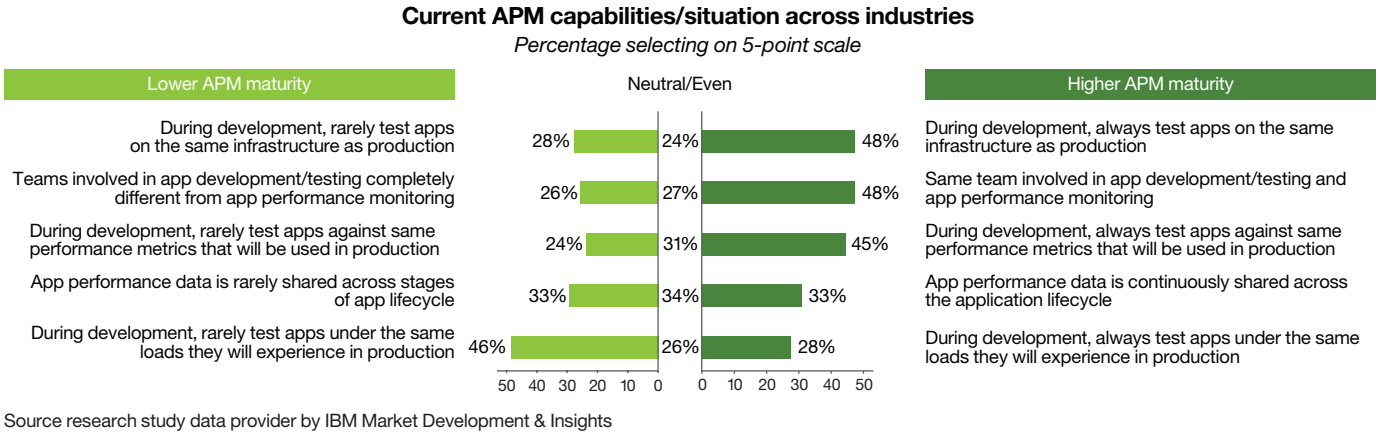


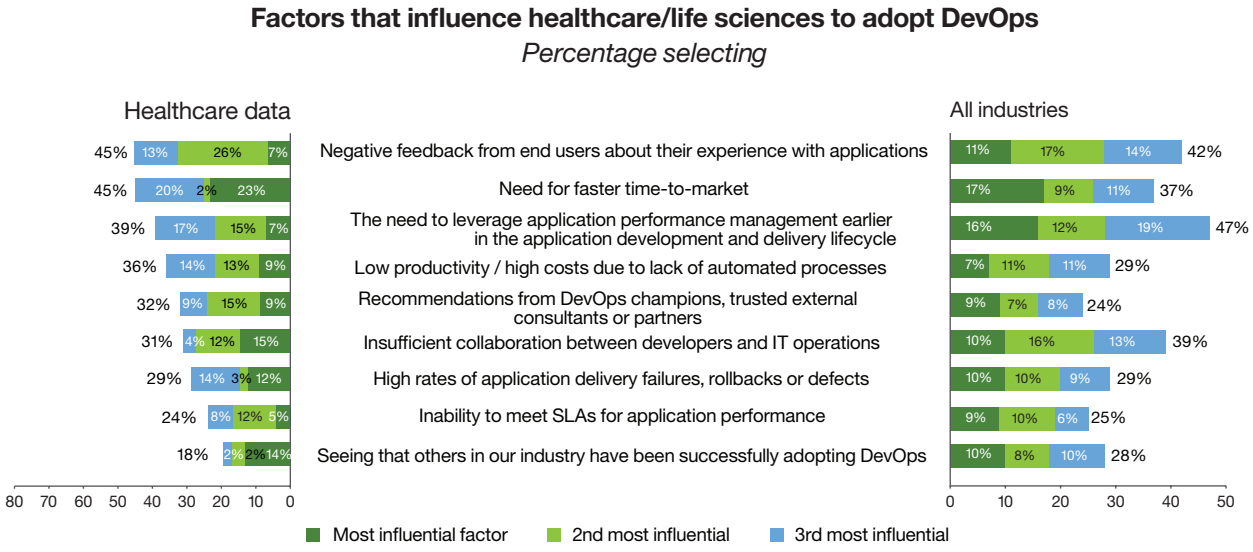

*Figure 5*. This chart depicts practices that are indicate of lower and higher APM maturity across industries.

## Technical successes and challenges

As shown in Figure 5, almost half (48 percent) of cross-industry companies surveyed state that during application development, their applications were always tested on the same infrastructure as production, and that the same team involved in application Dev/Testing was also involved in application performance monitoring. Healthcare and life sciences companies are in line with cross-industry respondents in always testing apps against the same performance metrics used in production (47 percent versus 45 percent)—which attests to the diagnostic nature of many healthcare applications. And they are less likely, during development, to always test apps under the same loads they will experience in production (17 percent versus 28 percent). Duplicating similar loads could be less critical in a healthcare and life sciences scenario, as opposed to retail or video streaming applications.

## Why adopt DevOps practices? Anticipated benefits and critical drivers

As noted earlier, DevOps adoption is driven by the need to use APM earlier in the application development and delivery lifecycle—according to 39 percent of healthcare and life sciences respondents (versus 47 percent across industries) who cite it as a critical influence. Because these companies already tend to monitor/manage applications in development and share performance data across application lifecycle stages, this factor is less of a driver for them.

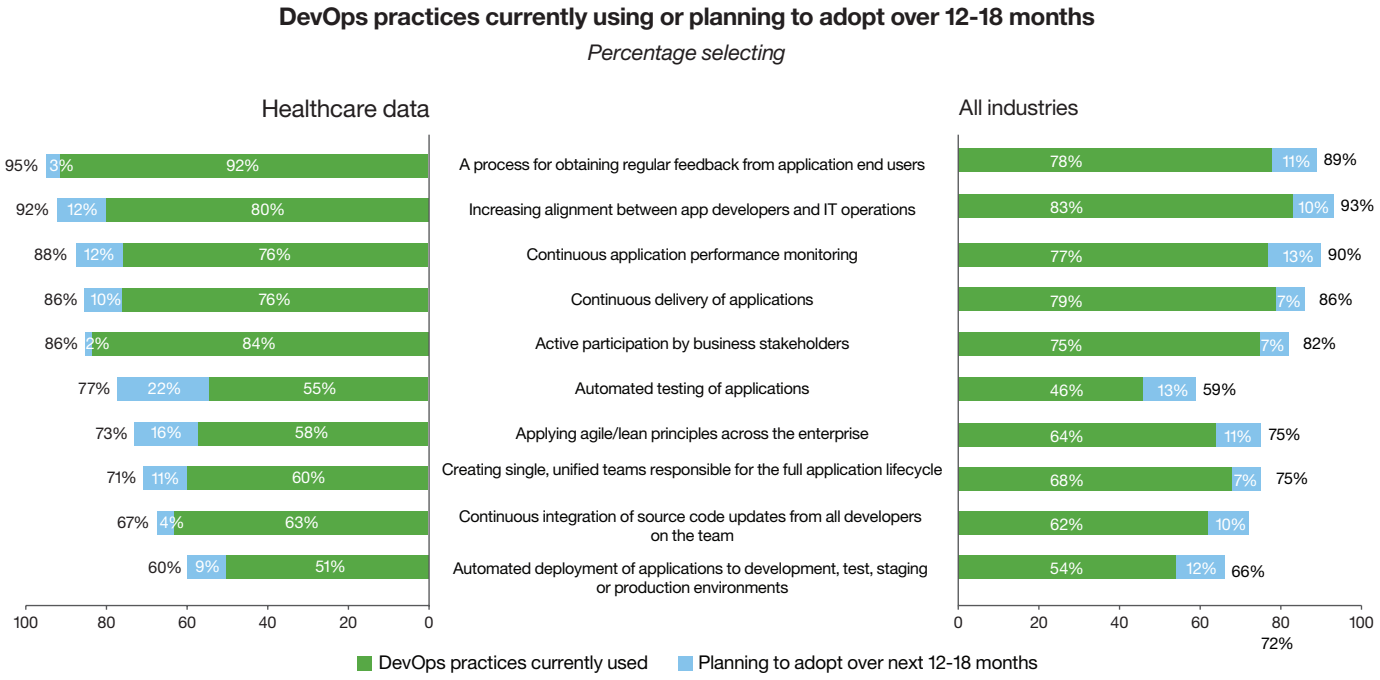



Source: Research study data provided by IBM Market Development & Insights.

*Figure 6*. Respondents cite numerous factors as influencing their decision to adopt DevOps.

Companies across industries are also drawn to DevOps practices to improve customer satisfaction by avoiding negative feedback from end users about their application experience. Healthcare and life sciences organizations demonstrate similar motivations. Additionally, a DevOps environment alleviates a lack of collaboration between application developers and operations, and enables companies to deliver applications faster into the market (see Figure 6). Healthcare and life sciences organizations are also driven by a greater need for faster time to market (45 percent versus 37 percent across industries)—not surprising, given the competitive nature of the industry.

As shown in Figure 7, cross-industry organizations advance their DevOps journeys by adopting a range of practices. Healthcare and life sciences organizations and cross-industry respondents demonstrated similar rates of adoption across most of these areas. However, these healthcare and life sciences companies tend to use automated testing of applications (77 percent versus 59 percent)—a more economical option that reflects often tight budgets in the industry.




Source: Research study data provided by IBM Market Development & Insights.

*Figure 7.* Respondents indicate a number of practices that they are currently using or plan to adopt over the next 12 to 18 months.

Note: Study participants were required to have a sufficient level of DevOps adoption.

## Incorporating APM solutions across DevOps: Significant results across industries

As companies across industries adopt DevOps and incorporate APM solutions—not just in application deployment, but during application development and testing as well—the results are significant:

- Costs from application downtime decrease
- Customer satisfaction increases
- Time-to-market for new applications decreases
- Better governance and risk management
- More advanced flexible skills among employees

*"What used to happen was, you provided customers a finished product that could have taken a lot of development hours. And the customer could say, 'I want this changed.' We have to throw out thousands of those hours. This approach saves money."*

— Mid-level IT manager, 5000+ employees

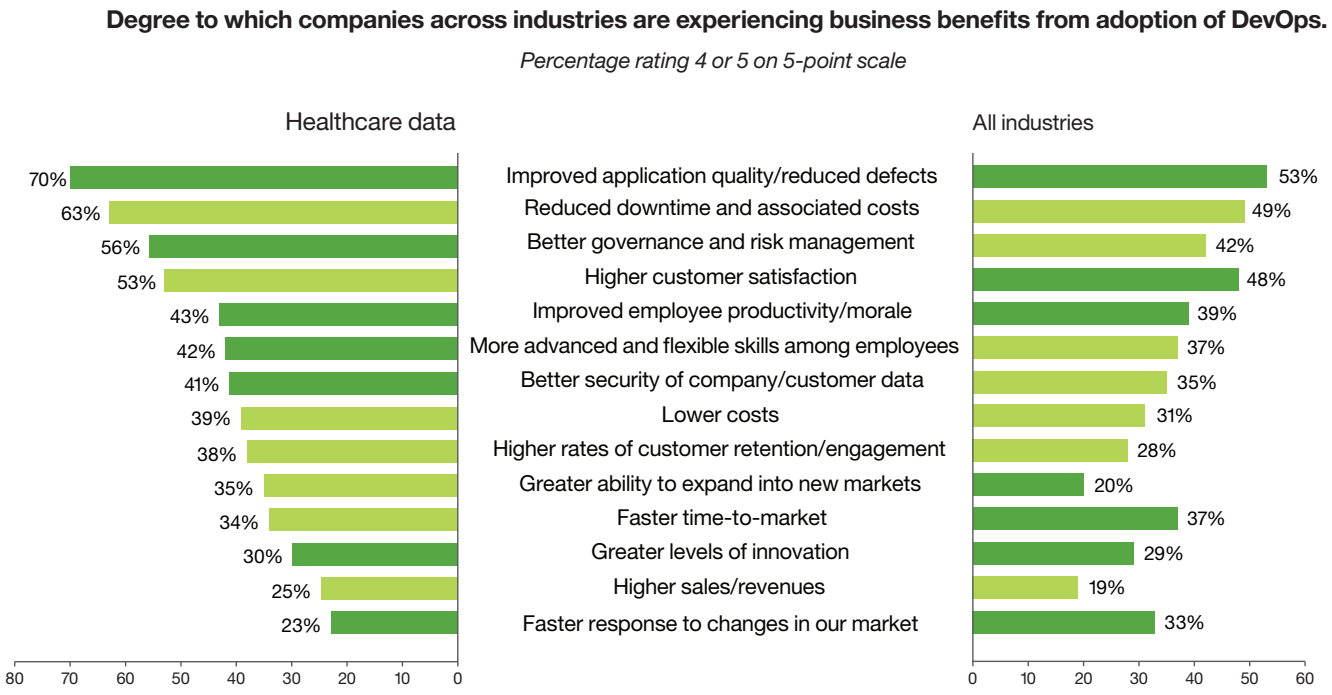



*Figure 8.* Many respondents report experiencing significant business benefits from adopting DevOps.

*When compared to cross-industry respondents, healthcare and life sciences organizations achieve notable success in using DevOps to improve application quality and reduce defects (70 percent versus 53 percent)*. (See Figure 8.) These companies are also more likely (92 percent versus 78 percent) to use a process for obtaining regular feedback from application end users. For example, these could be clients who access medical records or use telemedicine services. Having a consistent feedback mechanism supports their outstanding results in this area.

These benefits impact not only a company's business performance at the top line with higher revenues realized through greater customer satisfaction, but at the bottom line as well, translating to cost savings from reduced downtime.

*Greater adoption of DevOps, integrated with APM solutions, also helps companies achieve greater innovation than competitors. The study shows that cross-industry companies further along the DevOps and APM maturity curve introduced more applications over the past three years versus companies that are lagging. Such companies are also more likely to use APM tools today, as well as plan to adopt even more in the future — with particular emphasis on the analytics components of those solutions. By continuing to enhance APM across the DevOps lifecycle, businesses can achieve even greater competitive advantages.*

## Going forward: The trend toward integrating APM with DevOps

*IBM anticipates an increased correlation across industries between the implementation of DevOps practices and the value placed on key features and functions of APM solutions.* These include analytics capabilities, application quality, customer satisfaction and governance.

The survey predicts that across industries, over the next 24 months:

- More than half of companies will use (or are using) diagnostic tools to identify root causes of application issues by analyzing log data/message activity, while almost half put emphasis on predictive analytics capabilities.
- Almost 30 percent of companies will have analytics capabilities fully integrated with APM tools.
- Roles and responsibilities will also continue to evolve and merge as DevOps reaches greater heights on its adoption curve.

As healthcare and life sciences companies look ahead over the next 24 months, their goals reflect the integrated, flexible nature of their applications—as well as an open source structure that facilitates flexibility and access across teams and organizations. These companies are:

- More likely to continuously share app performance data across the application lifecycle (60 percent versus 37 percent across industries)
- More likely to use an integrated solution to coordinate development, testing, operations and app performance management (46 percent versus 27 percent)
- More likely to adopt automated testing of applications (77 percent versus 59 percent)
- Less likely to involve the same team in application development/testing and app performance monitoring (30 percent versus 46 percent)

In short, these companies will continue to use APM and DevOps to support an agile, open source development environment—one that will ultimately help foster greater organizational efficiencies, increased wellness and satisfaction for customers, and innovations that are transforming the healthcare and life sciences industry.

*"When our end customers notice that we're moving forward, they're excited about the changes and they can see the benefits."*

— App Developer, 1000–4999 employees

## What's next for you?

If you're looking to achieve the benefits of incorporating APM solutions across DevOps, consider some of the best practices implemented by respondents who are higher on the DevOps and APM adoption curve— organizations that have achieved or are well on their way to digital transformation. They tend to:

- Test applications on the same infrastructure and loads used in production environments
- Use the same team across application development, testing and production
- Test applications against the same performance metrics that will be used in production
- Use an integrated APM solution across development, testing and production— including a single, unified dashboard
- Automate all application performance monitoring

Perhaps you are just now considering an APM and DevOps strategy. Or perhaps you have embarked on this journey but are experiencing challenges. Maybe you are already using APM across the DevOps phases, but you want to enhance your approach. IBM® DevOps and APM solutions can help you, no matter where you are in your APM and DevOps evolution.

## The IBM APM portfolio

The IBM APM portfolio helps you detect and address software application issues, so your end users have a quality experience. IBM offers a single user interface to help you easily monitor your internal and external applications. For example, IBM can:

- Extend your hybrid management environment capabilities
- Measure the customer experience from multiple locations
- Further eliminate blind spots in your application environment
- Improve application quality and stability
- Accelerate release cycles and reduce costs

For more information on how the IBM APM portfolio can help you, visit ibm.co/LearnIBMAPM. You can see a five-minute walkthrough of availability monitoring at ibm.co/2jxAWPS.

## The IBM DevOps approach

The IBM DevOps approach helps organizations incrementally adopt DevOps practices, enabling them to accelerate innovation without tradeoffs in terms of cost, quality or risk. Organizations can make the most of existing investments and build an environment in which open source and proprietary lifecycle tools coexist and interoperate. IBM DevOps solutions can accelerate application updates and innovation by:

- Reducing time to customer feedback
- Increasing quality
- Reducing risk and cost
- Unifying processes, cultures and tools across the application lifecycle

To learn more on how the IBM DevOps approach can help you, visit **ibm.com/**cloud-computing/products/devops. Also check out an introduction of IBM DevOps processes, including availability monitoring for IBM Bluemix®, at ibm.co/2jmS518.

## For more information

Please visit our IBM APM website at ibm.co/Learn.co/2rK67yZ. Also, check out the IBM APM demo at ibm.co/APMdemo3.



IBM Corporation
IBM Cloud
Route 100
Somers, NY 10589

Produced in the United States of America
June 2017



[1] "Healthcare mergers and acquisitions in 2016: Running list." Healthcare Finance. Dec. 28, 2016. (www.healthcarefinancenews.com/slideshow/healthcare-mergers-and-acquisitions-2016-running-list?p=76)

[2] IDC. "IDC FutureScape: Worldwide Healthcare IT 2017 Predictions." Doc # US41864316. Nov. 2016. (https://www.idc.com/getdoc.jsp?containerId=US41864316)

[3] Evans Data Corporation. "Global Development Survey 2016 Volume I." May 31, 2016. (www.evansdata.com)

[4] Research study data provided by IBM Market Development & Insights.