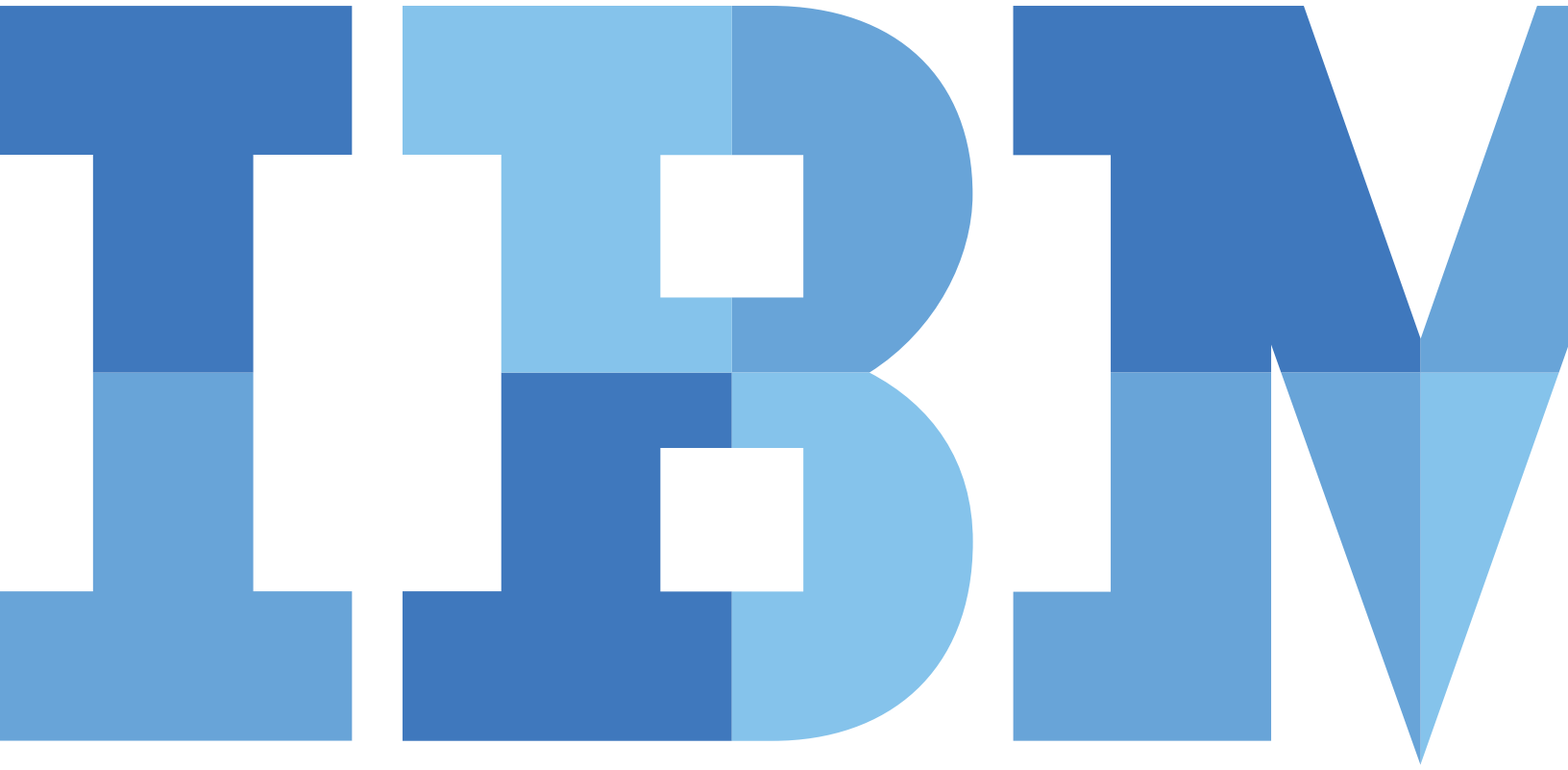
Application Performance Management and DevOps: A telecommunications perspective

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



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APM and DevOps: Agile, responsive application development for the telecommunications industries

The world is becoming increasingly mobile, and developing countries are jumping straight to cell phones—completely bypassing traditional landlines. The Internet of Things (IoT) is creating an avalanche of data points in a myriad of data, video and audio formats. The boundaries between carrier and content are disappearing, and increasingly, telecommunication companies (telcos) are also serving as Cloud Service Providers (CSPs). Your telco organization must reinvent itself in this era of technical transformation and global expansion by generating new revenue streams through creating new services—all while safeguarding against increasingly complex security threats.

Telcos are not only CSPs, they are also heavy adopters of cloud in general. In fact, 89 percent of telcos run more than half of their applications in a cloud environment, compared to the 56 percent average across industries. In addition to their role as CSPs, the *types* of applications used by telco companies also drive them to the cloud. For example, telcos are more likely to use streaming applications (66 percent versus 21 percent)—for which cloud computing is critical. Telcos gravitate toward cognitive/machine learning/AI applications (34 percent versus 13 percent)—applications that thrive on the cloud.[1] Given the agile, rapid-fire software creation cycles incubated in the cloud—and heightened expectations from increasingly sophisticated end users—telcos must launch innovative services with ever-shorter development iterations.

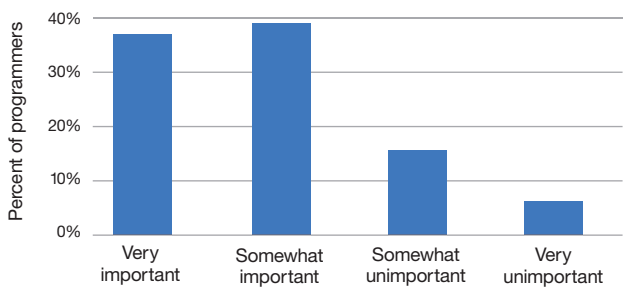
According to IDC, telcos can expect a number of critical technical developments, including:

- By 2018, more than 65 percent of enterprise unified communications and collaboration (UC&C) implementations will be cloud-based UC as a service (UCaaS).
- By 2018, more than 90 percent of enterprises will use communications service provider "cloud connect" services to access multiple public cloud Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) capabilities by using VPN, Ethernet and fiber networks.
- By 2020, 75 percent of CSPs will offer customized pricing structures for enterprise connectivity services, enabling enterprise line-of-business managers to include connectivity as a part of commercial goods and services, especially IoT.
- By 2019, enterprises will require an integrated portal for managing disparate vendors and monitoring tools.[2]

How can your telco organization succeed against keen competition? By incorporating both DevOps and end-to-end application performance management (APM), you can be more responsive to the iterative, agile development cycles that your industry requires. In fact, 43 percent of telco companies rank turning APM into a revenue generator as a top objective—a response that far exceeds the cross-industry average of 19 percent.

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]

How important is DevOps to your overall digital strategy?

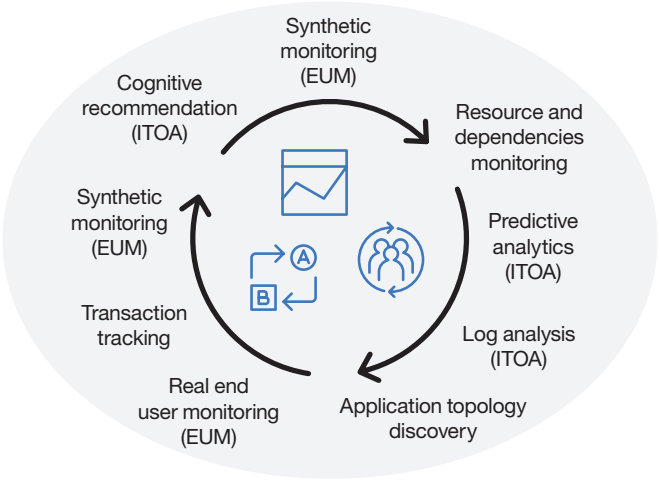


Source: Global Development Survey: Vol. 1, © 2016 Evans Data Corp., Date published: 05/31/2016.

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

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



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

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.

Development and testing 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."

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.

Telecommunications comprised 39 of the 519 participants. This paper outlines key research findings across all industries and highlights areas in which telcos diverged from typical cross-industry responses.

APM solutions: Who's accountable?

About a third of cross-industry respondents said 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 reflects the increasing synergies throughout the DevOps process.

Compared to industries in general, telco companies involve more roles in application performance monitoring and management (6.2 roles versus 4.5), including:

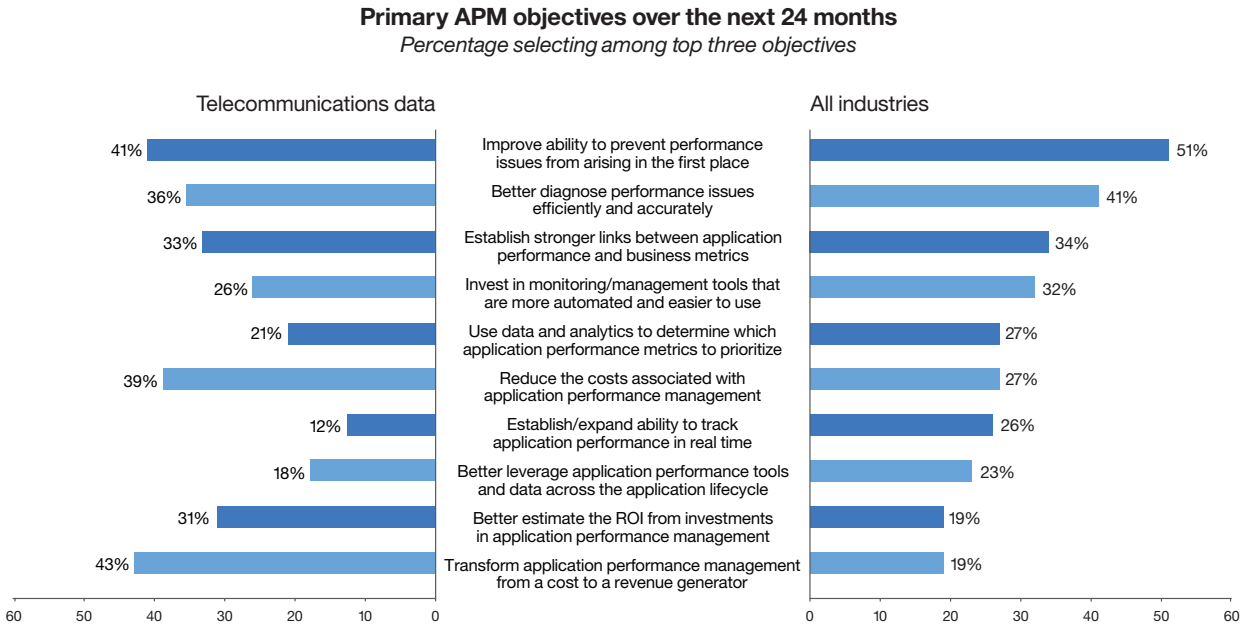
- Head of IT operations and infrastructure (70 percent versus 51 percent)
- Head of quality assurance (QA) testing (52 percent versus 15 percent)
- End users of the application (50 percent versus 28 percent)
- Marketing personnel (27 percent versus 7 percent)

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. However, telcos are unique in that external providers such as third-party developers and consultants (44 percent versus 18 percent) and marketing (40 percent versus 10 percent) also exert strong influence—possibly a reflection on the revenue-generating nature of telco applications.

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 of cross-industry respondents state that preventing application performance issues from arising in the first place was key (see Figure 3). Only 41 percent of telcos responded that preventing such issues was a primary objective. However, telcos excel at using predictive analytics tools that spot potential application performance issues so they can be addressed proactively (50 percent versus 22 percent for cross-industry companies). The "preemptive strikes" against fledgling issues could override the need to prevent such issues entirely.

And, as noted earlier, telco companies' emphasis on transforming APM from a cost to a revenue generator (43 percent versus 19 percent) is a striking differentiator.



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

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

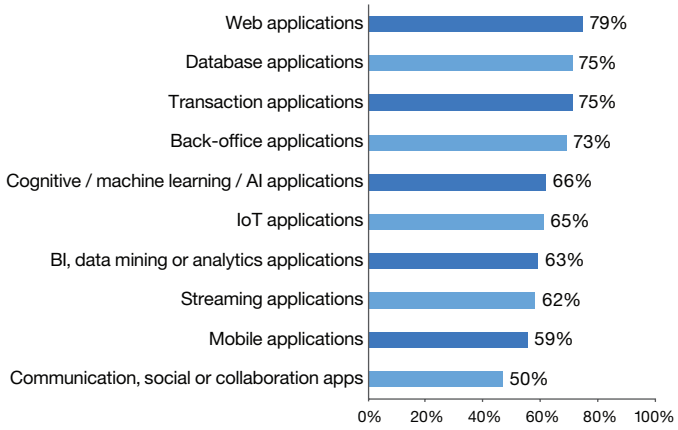
Investing in automated, easier-to-use APM tools

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. Figure 4 shows the types of applications for which APM tools are currently used across industries.

Given their increased levels of cloud adoption, telco companies are almost twice as likely to use cloud-based and/or SaaS solutions or tools for application performance monitoring and management (53 percent versus 27 percent). However, telcos are less apt to use dashboards for monitoring historical trends of key application resources (41 percent versus 61 percent). Because of the intensity and breadth of telco cloud adoption, historical application trends may be of less value.

Types of applications for which APM tools are currently used across industries

Percentage selecting, among companies using APM tools and applications



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

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

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.

With a minority of companies using analytics tools in APM, telcos lead the way in using predictive analytics tools that can foresee potential application performance issues so they can be addressed proactively (50 percent versus 22 percent).

Integration is also a critical component for telcos. They are more likely than the market average to have plans to fully integrate analytics tools with other performance management tools (51 percent versus 29 percent). And when purchasing APM tools, they tend to value analytics tools that are integrated with other performance monitoring tools (80 percent versus 59 percent).

"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."

— CIO, 1,000-4,999 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.*

Once DevOps was integrated, almost half of respondents say the approach actually 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.

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.

Telcos were less likely to rarely test apps on the same infrastructure during development as production (8 percent versus 28 percent). While this trend signifies a higher level of APM maturity, telcos are also less apt to continuously share application performance data across the application lifecycle (15 percent versus 33 percent)—a characteristic of lower levels of APM maturity.

One challenge cited by respondents at large: *they rarely test applications under the same IT loads that will be experienced in a production environment*. Some participants observe that although APM solutions are used in the application development phase, the application performance monitoring process uses separate dashboards and lacks an integrated solution to coordinate activities across the application lifecycle.

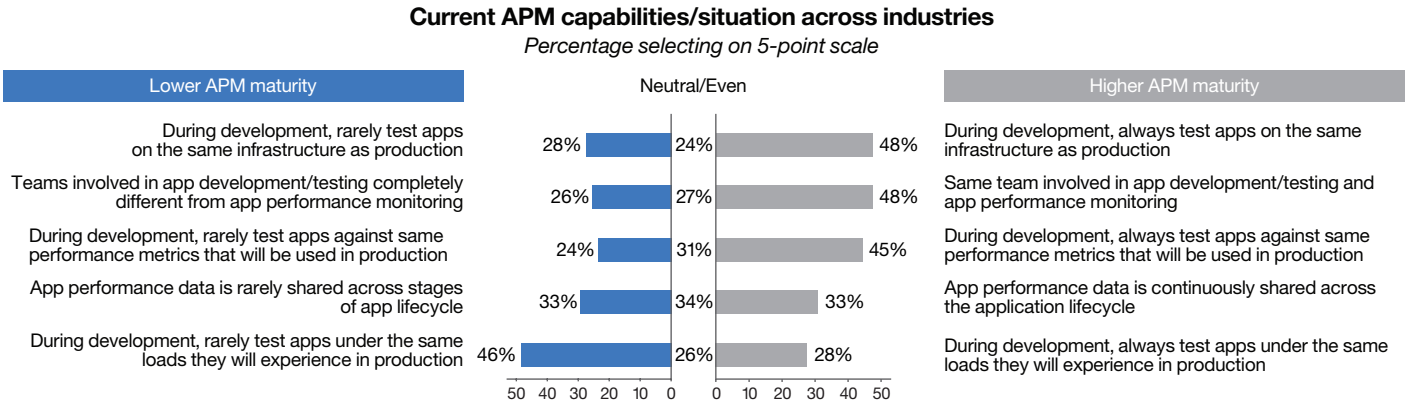
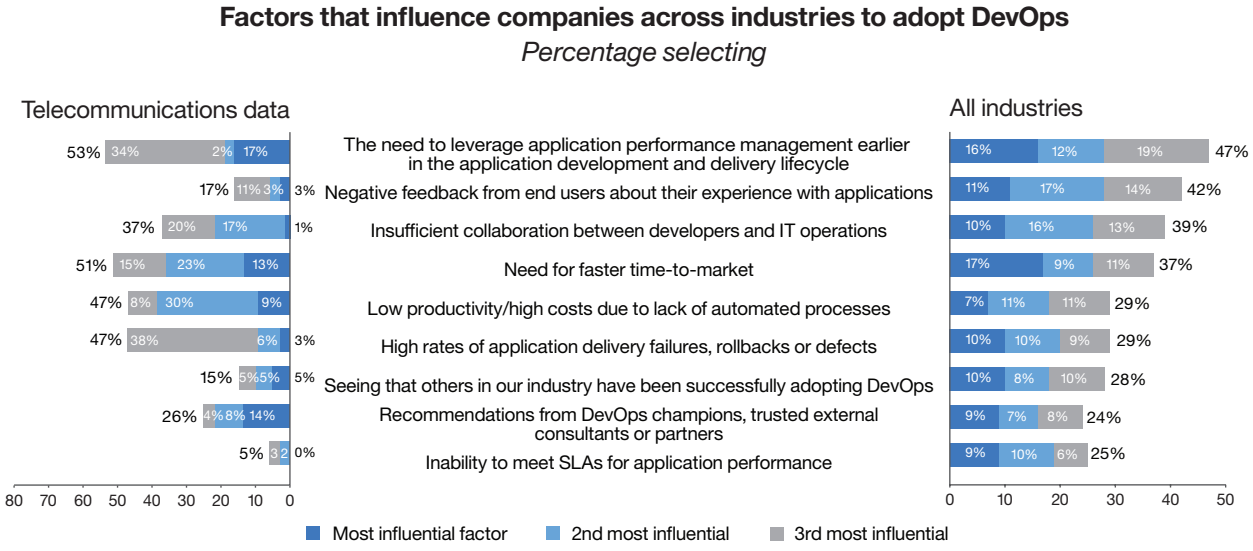


Figure 5. Practices that are indicative of lower and higher APM maturity.

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 47 percent of cross-industry respondents who cite it as a critical influence.

As shown in Figure 6, companies across industries are also drawn to DevOps practices as a way to improve customer satisfaction by avoiding negative feedback from end users about their application experience. Additionally, a DevOps environment alleviates a lack of collaboration between application developers and operations, and enables companies to deliver applications into the market more quickly. Telcos are more likely than the market average (47 percent versus 29 percent) to cite high rates of app delivery failures, rollbacks, or defects as most influential in adopting DevOps.



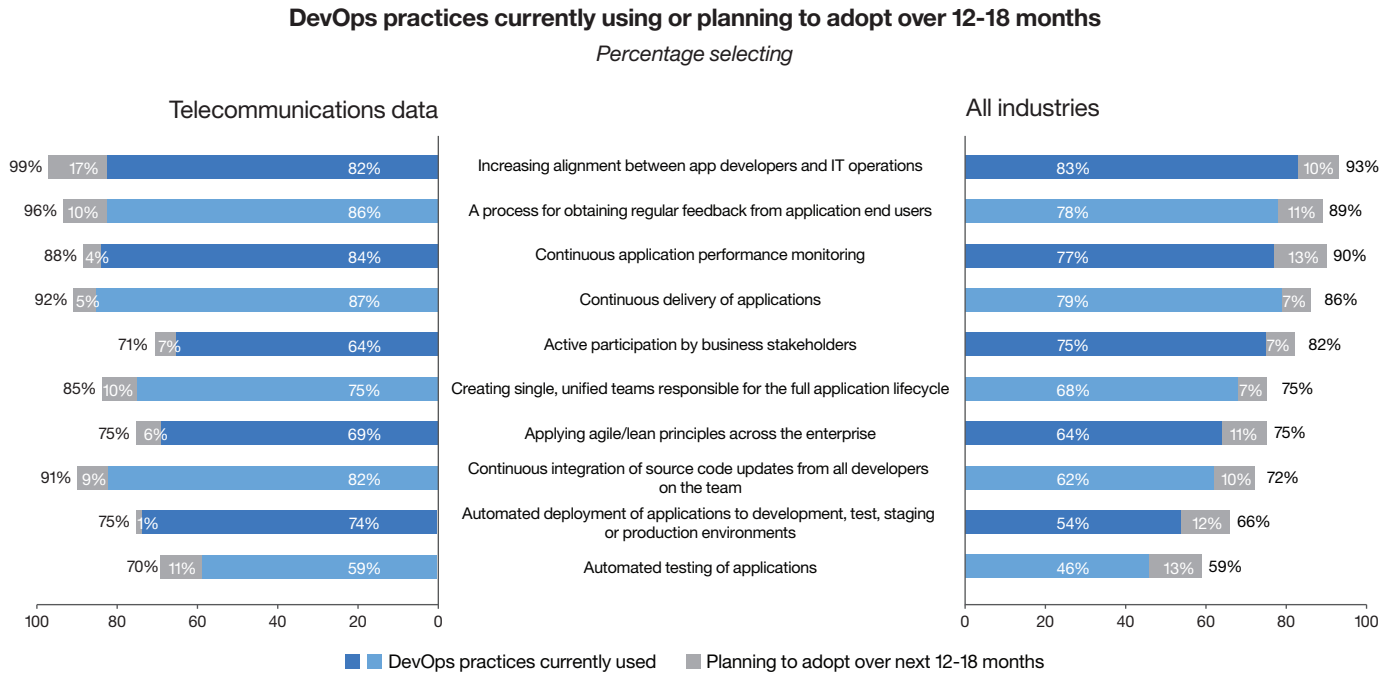
Source: Research study data provided by IBM Market Development & Insights.

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

As shown in Figure 7, many companies advance their DevOps journeys by:

- Increasing alignment between application developers and operations
- Enabling a process for obtaining regular feedback from application end users—resulting in higher rates of customer engagement and retention
- Driving continuous application performance monitors
- Facilitating continuous delivery of applications

However, telco companies demonstrate two key differences in this area. They are more likely to use continuous integration of source code updates from all developers on the team (82 percent versus 62 percent). And they also tend to use automated deployment of applications to development, test, staging, or production environments (74 percent versus 54 percent).



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

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

Incorporating APM solutions across DevOps: Significant results across industries

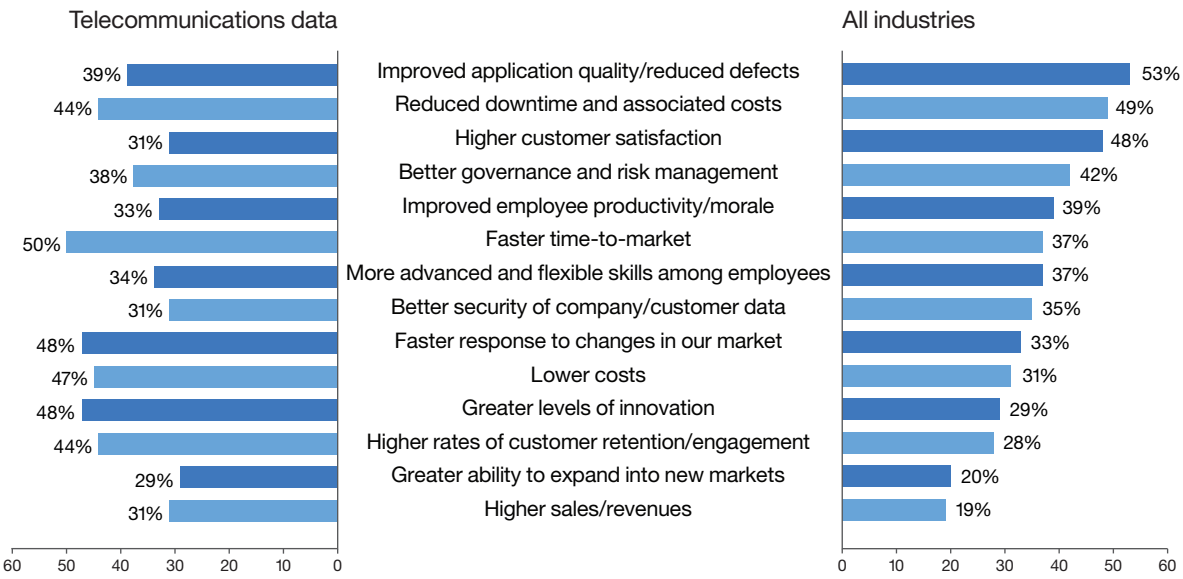
As companies across industries adopt DevOps and incorporate APM solutions—not just in application deployment, but during application development and testing as well—the results are significant. Telco results are just as impressive, as shown in Figure 8. Many telcos report faster time-to-market, faster response to market change and greater innovation as DevOps benefits. In fact, 48 percent of telcos report greater innovation as a benefit, as opposed to just 29 percent of cross-industry responses. And telcos report higher sales and revenues at about 50 percent greater rates than cross-industry responses. This all aligns with industry pressure to continuously innovate and deliver new services quickly to stay competitive.

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 46 percent 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.

Degree to which companies across industries are experiencing business benefits from adoption of DevOps.

Percentage rating 4 or 5 on 5-point scale



Source: research study data provided by IBM Market Development and Insights.

Figure 8. Telcos report significant business benefits from adopting DevOps, with some key differences from cross-industry respondents.

Going forward: The trend toward integrating APM with DevOps

Telco companies stand out from cross-industry respondents with two major trends:

- Heavy adoption of cloud environments (89 percent of telcos run more than 50 percent of their applications on the cloud, compared to the 56 percent across industries)
- Objective of turning APM into a revenue generator (43 percent versus 19 percent)

With telcos often serving as CSPs and increasingly providing services directly to their customers, analytics capabilities, application quality, customer satisfaction and governance will continue to grow in importance. *In fact, IBM anticipates an increased correlation across industries between the implementation of DevOps practices and the value placed on these key features and functions of APM solutions.* The survey predicts that over the next 24 months, almost 30 percent of cross-industry companies will have analytics capabilities fully integrated with APM tools. And, roles and responsibilities will also continue to evolve and merge as DevOps reaches higher heights on its adoption curve.

The survey anticipates that over the next 24 months, almost 30 percent of cross-industry companies will have analytics capabilities fully integrated with APM tools. Telco companies should excel in this area, with 51 percent more likely to have achieved this milestone. Within two years, telco companies are less likely to:

- Use separate solutions to coordinate development, testing, operations and app performance management (24 percent versus 38 percent)
- Continuously share application performance data across the application lifecycle (15 percent versus 37 percent)
- Use a single, unified dashboard for app performance monitoring (12 percent versus 35 percent)

Within two years, telcos are more likely to have many separate dashboards (52 percent versus 31 percent). Note: With more applications to deploy, telcos may have difficulty finding an integrated dashboard.

With a minority of companies using analytics tools in APM, telcos stand out for currently using predictive analytics tools that can foresee potential application performance issues so they can be addressed proactively (50 percent versus 22 percent)—again, a reflection on the revenue generating nature of their applications. *To that end, 41 percent of telcos will continue to integrate DevOps and APM to improve their ability to prevent performance issues from arising in the first place.*

"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. Their organizations 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/2rK67yZ. Also, check out the IBM APM demo at ibm.co/APMdemo3.

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[1] Source research study data provided by IBM Market Development & Insights.

[2] IDC. "IDC FutureScape: Worldwide Telecommunications 2017 Predictions." November 2016. Doc# US41921616. (www.idc.com/getdoc.jsp?containerId=US41921616)

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

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