



How To Implement DevOps Automation And Achieve True Cloud Agility

FEATURING RESEARCH FROM FORRESTER

Case Study: Dynatrace's Journey Toward
Delivering Business Transformation

How To Implement DevOps Automation And Achieve True Cloud Agility

Every business today is a software business. To this end, nearly every organization on the planet is quickly attempting the impossible – to dramatically shift to becoming a software company. Speed of transition is imperative – go too slowly, and the competition will erode your relevance.

To address the need for speed, Dynatrace has embraced the cloud, implemented DevOps practices, applied automation to increase productivity, and utilized container and microservice architectures to allow for faster development and deployments.

This brings an exponential increase in complexity, with enterprises today needing to gain visibility and performance intelligence into their entire ecosystem, from their new dynamic cloud platforms, to their static legacy systems – and everything in-between.

In this case study, Forrester reviews how Dynatrace is successfully accelerating innovation in response to this rapidly changing market, and outlines the best practices identified by the company during its business transformation, to help other organizations replicate its success.

REINVENTING A COMPANY FROM THE GROUND UP

Five years ago, Dynatrace, an APM market leader, foresaw the changes being created by the continued march towards the cloud and realized that traditional approaches to application monitoring would not suffice in a highly dynamic cloud environment.

To adapt to the market change, Dynatrace took 40 of its best engineers off its existing market-leading product and empowered them to reinvent a new Gen 3 approach to enterprise monitoring. The ultimate goal was to be able to provide IT, DevOps and digital business teams with faster, real time answers, without the need to manually instrument, configure or search for answers.

IN THIS DOCUMENT

1 How To Implement DevOps Automation And Achieve True Cloud Agility

5 Research From Forrester: Case Study: Dynatrace's Journey Toward Delivering Business Transformation

20 About Dynatrace

The core of this was a single agent architecture, which could automatically be deployed at scale, and could capture high fidelity data, including microservices and containers, without any human intervention. This would then feed its custom AI-engine, which auto analyses the entire technology environment and can serve-up precise answers to performance issues, as well as the smallest variation in any code, process, service and user experience

CREATING A CULTURE OF CHANGE

Dynatrace realized that a shift of this magnitude needed more than just a technology refresh: it required a fundamental change in the way its development and operations teams functioned. To achieve that vision, it expanded its DevOps culture and emphasized a new focus on continuous improvement across development and operations teams, and shifted all operations resources to development.

Using its own product, it made all developers responsible for their own code in production. This dramatic empowerment was referred to internally at Dynatrace as ‘NoOps’ and enabled the company to enhance the quality of its code in production, improve customer experience and accelerate innovation.

FROM TWO MAJOR RELEASES PER YEAR TO 26

Dynatrace’s journey exemplifies the key focal points for organizations looking to make their own shift to DevOps to drive business transformation. The 2018 updated results show continued improvements and success:

Increased agility	~200 code commits / day	340 stories per two-week sprint	24 x more releases
Increased quality	31,000 unit and integration tests / hour	68h UI tests per build	93% production bugs found by development
Increased stability	~1000 global EC2 instances	99.99% global availability	~5000 deployments / day

FROM APPLICATION PERFORMANCE MANAGEMENT (APM) TO SOFTWARE INTELLIGENCE

The reinvention of Dynatrace, with the industry’s 3rd Gen AI-powered monitoring, allows companies to move beyond 2nd Gen traditional APM monitoring to a more autonomous platform driven by software intelligence.

With automation at the core, Dynatrace is uniquely positioned to simplify cloud operations and accelerate DevOps at scale:

- DevOps in the Cloud – Dynatrace’s AI-powered application monitoring transcends the challenges that human beings struggle with and empowers IT teams to manage complex, hyper-dynamic web-scale applications; enabling cloud native organizations to redefine monitoring as they mature from Continuous Integration, to Continuous Delivery, to DevOps, to NoOps.

- DevOps in the Enterprise – Dynatrace’s AI and automation capabilities empower organizations to master the speed and complexity of enterprise cloud native operations; supporting shift-left testing so only “good builds” reach production and shift-right self-healing, to minimize risk for business and operations.
- DevOps Collaboration – Dynatrace enables organizations to create a single source of “business truth” throughout the delivery pipeline, supporting true DevOps collaboration with automated feedback on goals and performance in a way that is easy to understand in tools that team members are familiar with (no learning new tools).
- DevOps Toolchain Integration – Dynatrace integrates and synchronizes your cloud tool chain with Dynatrace’s API to glean rich, AI-powered contextual data for performance improvements and self-healing processes that reduce mean-time-to-repair (MTTR) for higher quality and shorter release cycles.

Enjoy, and dig in to the complementary “Dynatrace’s Journey Toward Delivering Business Transformation” report for more details.

Case Study: Dynatrace's Journey Toward Delivering Business Transformation

A Software Vendor's Evolution From Waterfall To DevOps To NoOps

by Robert Stroud and Elinor Klavens

August 7, 2017

Why Read This Report

Software vendors face pressure to transform the way they deliver their solutions to customers; they must provide competitive advantage and differentiation to keep increasing revenue. This requires quality and speed — and the complete automation of the continuous delivery pipeline. This case study will help infrastructure and operations (I&O) professionals understand how Dynatrace adopted development and operations (DevOps) to shift from a traditional development and delivery model to continuous delivery, ensuring rapid value and continuous innovation for its customers.

Key Takeaways

Testing Delivers Speed And Quality

During the transition to DevOps, teams often become confused, believing they must trade off speed for quality or vice versa. They're used to looking at their own code and focusing on their own siloed metrics (and traditional metrics) for speed and quality.

Proactive Remediation Delights Customers

Instead of identifying product bugs at the end of the life cycle, Dynatrace left-shifted testing and performance responsibility to identify defects during development. Making developers responsible for the quality of code in production is one of the key indicators of DevOps maturity.

Customer-Centric Metrics Drive Innovation

Metrics that capture customer behavior enable the technology organization to glean insight into its customers' business needs. With metrics, everyone can see, for example, how quickly customers implement a new feature, whether they're using it, and how they're using it. Having access to the production monitoring data allows the tech organization to provide more business value to its customers.

Case Study: Dynatrace's Journey Toward Delivering Business Transformation

A Software Vendor's Evolution From Waterfall To DevOps To NoOps

by [Robert Stroud](#) and [Elinor Klavens](#)
with [Eveline Oehrlich](#), Aaron Kinch, and Diane Lynch
August 7, 2017

Table Of Contents

Situation: Dynatrace Needed To Accelerate Innovation

Approach: Dynatrace Adopted A New Way To Deliver Software

Dynatrace Is Using DevOps To Gain Visibility And Boost Release Speed And Quality

Dynatrace Has Embedded Continuous Improvement Into Its Culture

Results: Dynatrace's Business Transformation Delights Customers

Recommendations

Culture And Process Are Critical To DevOps/NoOps Success

Supplemental Material

Related Research Documents

[Boost Application Delivery Speed And Quality With Agile DevOps Practices](#)

[Brief: Embrace The Need For Speed To Avoid Ugly DevOps Practices](#)

[Top Eight Technology Trends That I&O Pros Should Watch: 2016](#)

Forrester Research, Inc., 60 Acorn Park Drive, Cambridge, MA 02140 USA
+1 617-613-6000 | Fax: +1 617-613-5000 | [forrester.com](#)

© 2017 Forrester Research, Inc. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. Unauthorized copying or distributing is a violation of copyright law. Citations@forrester.com or +1 866-367-7378

Situation: Dynatrace Needed To Accelerate Innovation

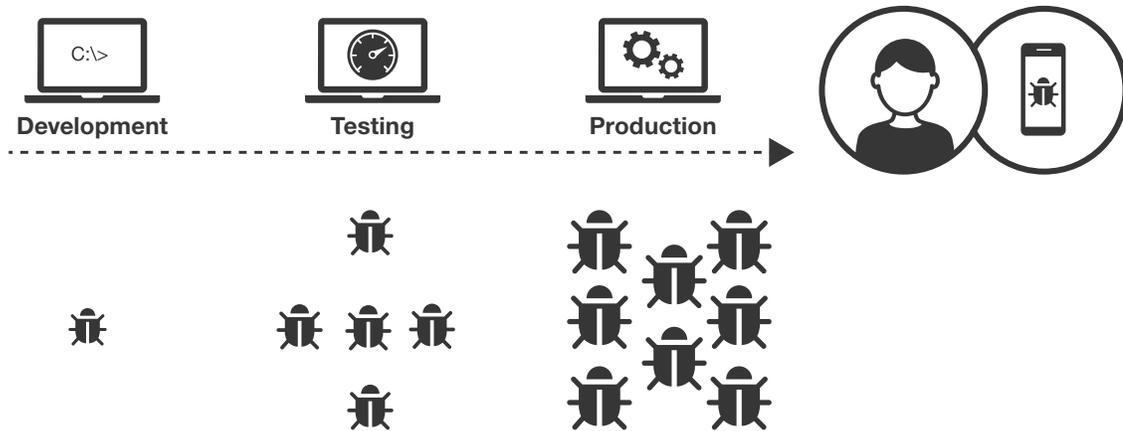
In a world of constant digital transformation, software vendors can use DevOps to transform how they deliver their solutions to customers.¹ We spoke with the DevOps team at Dynatrace to uncover the challenges it faced and the solutions it found — and to share its best practices.

Dynatrace is competing in a tough market, selling digital performance management software to technology organizations in Fortune 1000 companies.² To speed up innovation around its products, the vendor had to transform from DevOps neophyte to DevOps leader. It did this by focusing on three key areas: improving the experience of its customers, improving the quality of code in production, and creating a platform to accelerate innovation.³

In 2011, the market knew Dynatrace for its PurePath technology. However, slow release cycles caused challenges for Dynatrace and its customers. Dynatrace wasn't a software-as-a-service (SaaS) company, so it put out new releases twice a year, and customers installed them on-premises. While this was in line with the rest of the software industry, it caused significant problems for Dynatrace.

- › **Customers were sacrificing innovation for customization.** Customers rarely leveraged the newest releases; installations were often a year old and contained fragile configurations and customizations that didn't survive upgrades. For customers, maintaining the health of a shaky environment took precedence over installing new releases and leveraging new product features. When a problem occurred, Dynatrace engineers had to understand the dependencies and configurations of a customer environment before they could begin to resolve the defect.
- › **Engineers learned about the quality of the code only after a release.** In 2011, Dynatrace released upgrades twice a year in an installer that customers installed on-premises in their own data centers. As a result, Dynatrace engineers were blind to the quality of their code in production. This became obvious when a deluge of tickets arrived after each release (see Figure 1). The lack of automated testing tools meant that customers were the ones identifying product bugs, and Dynatrace development teams didn't have this information until the support tickets came in.⁴
- › **Firefights consumed resources for continuous improvement.** All the work on fixing bugs, responding to tickets, and understanding the current state and issues affecting customers meant there was no time left for continuous improvement. A hot fix took an average of five working days, and Dynatrace engineers provided ad hoc, reactive solutions to problems. This lack of repeatable processes robbed Dynatrace of the opportunity to improve.

FIGURE 1 Code Defects Multiplied In The Pipeline



Approach: Dynatrace Adopted A New Way To Deliver Software

In 2011, Dynatrace took decisive action to disrupt its own business model. It decided to transition to an as-a-service model, enabling it to more quickly release technology and better serve its customers. “You cannot sit on success,” says Bernd Greifeneder, Dynatrace’s chief technology officer. “You need to move forward, so when we started to see a shift in the software landscape, we wanted to be at the forefront of it.” Accordingly, Dynatrace has:

- › **Moved to an as-a-service model.** Transitioning to as-a-service models makes it easier for engineers to understand how customers are using their code.⁵ Dynatrace now treats infrastructure as code, allowing it to focus on its application and the value it offers rather than the infrastructure on which it runs. The cloud provides Dynatrace with the opportunity to leverage native platform components for failover and scaling. In addition to its SaaS offering, Dynatrace also has a managed on-premises option for customers who prefer to keep their data in-house. Real-time monitoring as well as performance and usage metrics, including customer behavior patterns, allow Dynatrace to adapt its products in line with customers’ needs.⁶
- › **Created real-time automated feedback loops to stay abreast of customer sentiment.** A key indicator of DevOps maturity is the ability to identify and act on feedback before it affects customers.⁷ Dynatrace now collects feedback through an automated Jira ticketing process, sharing escalations via ChatOps and VoiceOps integrations and sharing log analytics via APIs.⁸ Team leads hold a daily stand-up meeting, dedicating up to 15 minutes to look through the production feedback channels. They also use staging and dev environment channels to gain feedback, which they can then act on.

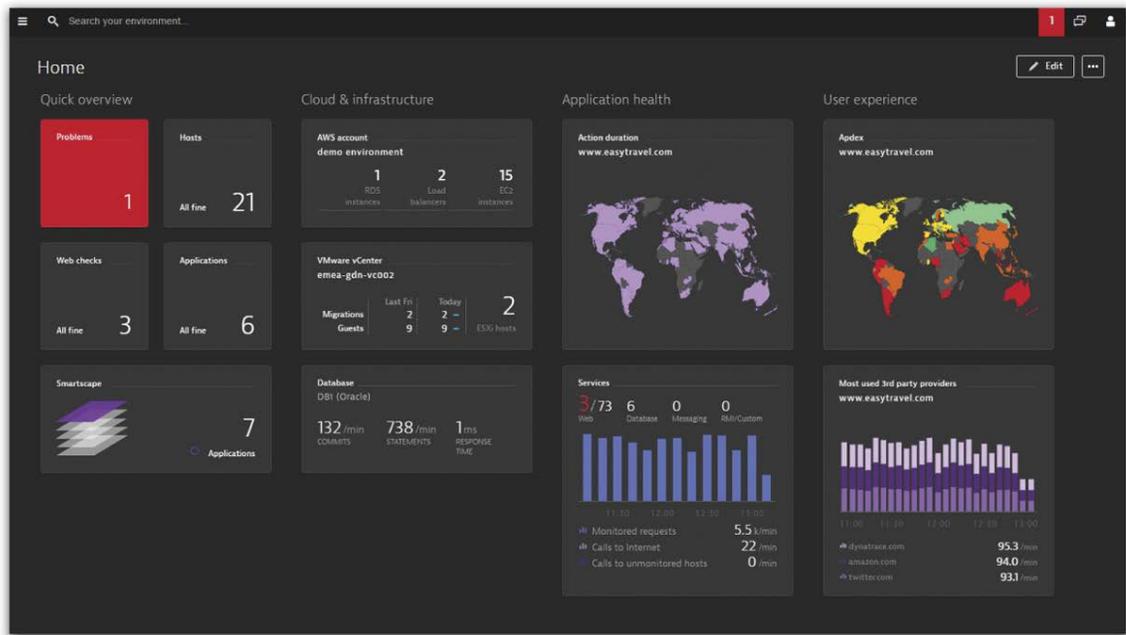
- › **Enabled customers to experience innovation immediately.** Currently, 85% of Dynatrace SaaS and managed customers are on code that's four weeks old or newer. To ensure that customers value their software solutions and renew their contracts, they must leverage the newest features. Dynatrace's move to SaaS and managed on-premises deployments has automated the upgrade process for customers, removing the pain of upgrades. The benefit of the significant reduction in production defects has boosted customers' confidence, while their desire for innovative features is driving adoption of the latest release.

DYNATRACE IS USING DEVOPS TO GAIN VISIBILITY AND BOOST RELEASE SPEED AND QUALITY

DevOps' focus on speed and quality helps I&O teams continuously deliver differentiating, competitive services and applications. To succeed, DevOps teams must enforce shared knowledge between dev and ops as well as leverage continuous testing across the life cycle.⁹ Dynatrace used SaaS testing tools to provide its developers with feedback on log analytics and crash analysis.¹⁰ This immediately eliminated many support tickets. Now, Dynatrace can assess its code's performance within 10 minutes of deployment to the next life-cycle phase. The vendor also:

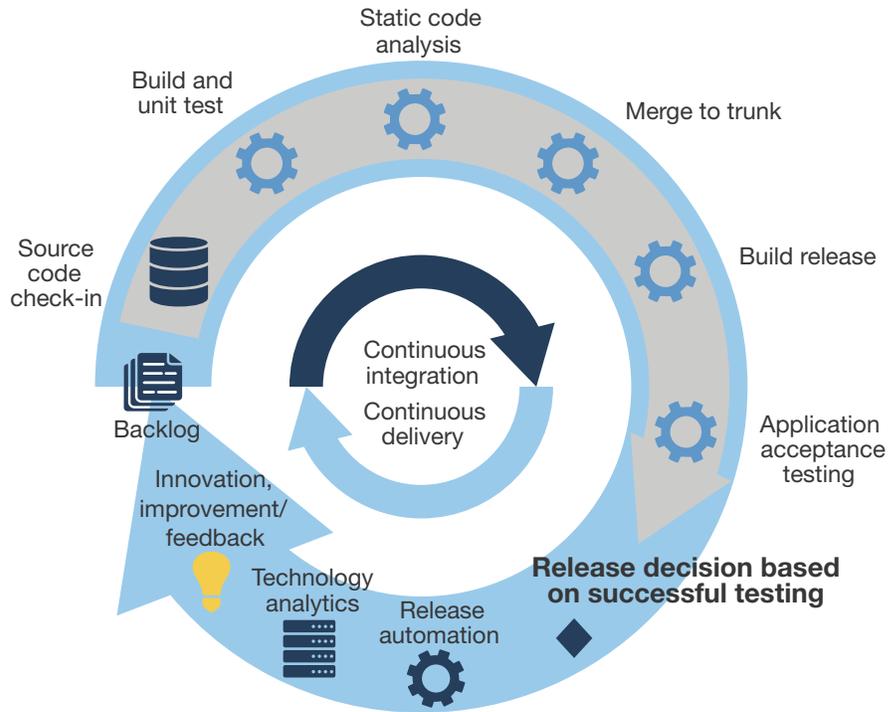
- › **Evangelizes and communicates the importance of daily deployment health.** Dynatrace reports daily on the health of its deployments across the pipeline (see Figure 2). It evaluates this via its automated test environment, which is critical to its deployments. If the performance of the environment deteriorates, it affects the whole development lab, creating a large group of angry, vocal engineers. Because of the impact on all teams, Dynatrace's culture now focuses on catching the majority of errors at earlier stages of the pipeline.
- › **Tests with depth and breadth.** Dynatrace's new approach to software development has enabled the company to create a key capability: proactive remediation. Instead of identifying product bugs at the end of the life cycle, Dynatrace has left-shifted testing and performance responsibility to identify defects in development. Dynatrace now runs more than 31,000 unit and integration tests per hour. The outcome for the user community includes 99.998% global availability and greater customer confidence and adoption.
- › **Automates the promotion of code through each environment for speed and quality.** Eliminating manual handoffs and automating the release cycle increases the speed and quality of releases.¹¹ An integrated and automated continuous delivery pipeline across the entire software delivery life cycle now enables Dynatrace's developers to code and push that code to the next phase of the development process (see Figure 3).¹² Release packages automatically transition through each phase, leveraging automation based on the success of the previous phase.

FIGURE 2 Dashboards Illustrate The Health Of The Pipeline And Customer Experience



Source: Dynatrace

FIGURE 3 Integrated Testing Creates A Healthy Pipeline That Consistently Releases Quality Code To Production



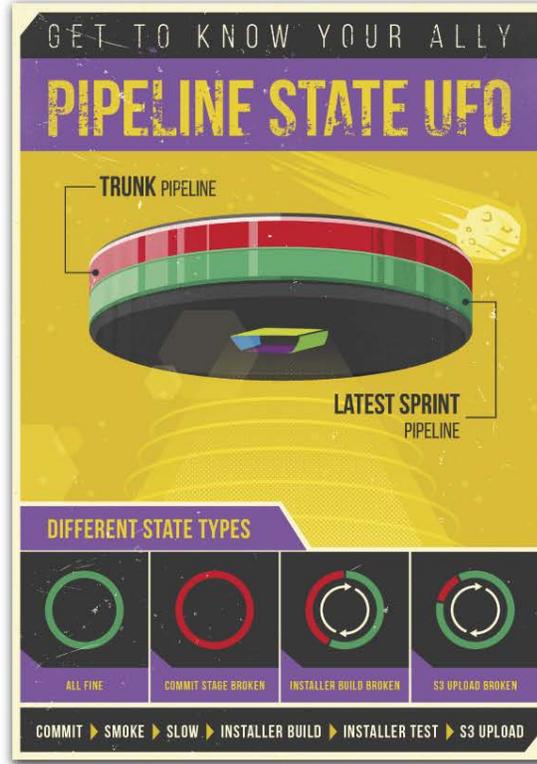
DYNATRACE HAS EMBEDDED CONTINUOUS IMPROVEMENT INTO ITS CULTURE

Dynatrace's new emphasis on proactive remediation within its continuous delivery pipeline means that its developers are now responsible for the quality of their code. As a result, the DevOps team has seen:

- › **Continued improvements to agility — the secret to delivering innovation.** Delivering small changes at speed is the key to delivering innovation.¹³ Today, Dynatrace's DevOps team averages 120 code commits per day and 340 stories per two-week sprint. As they're spending less time on urgent bug fixes, developers can now focus on developing competitive, innovative features for Dynatrace's solutions.
- › **Pipeline UFOs that operationalize performance culture.** At Dynatrace, the health of the pipeline is a common good. The DevOps team has installed floating reminders of this, such as pipeline "UFOs" (see Figure 4). They hang above teams working on code, with different settings that sound an alarm when the quality of the release is in danger. Focusing on pipeline health has encouraged teams to police their own quality: For example, developers hide every feature behind a feature toggle so they can test it properly before turning it on with production systems.¹⁴

- › **Automated testing to identify the border of speed and quality.** Defects are natural when you speed up your processes with DevOps. Dynatrace wants to identify these defects within its testing environments before pushing them to production; it has learned from its mistakes in 2011 and now flags and remediates bugs earlier in the process. As it performs tests upstream, there are no surprises upon release to production.

FIGURE 4 Embed Performance Culture With Reminders Of Pipeline Health



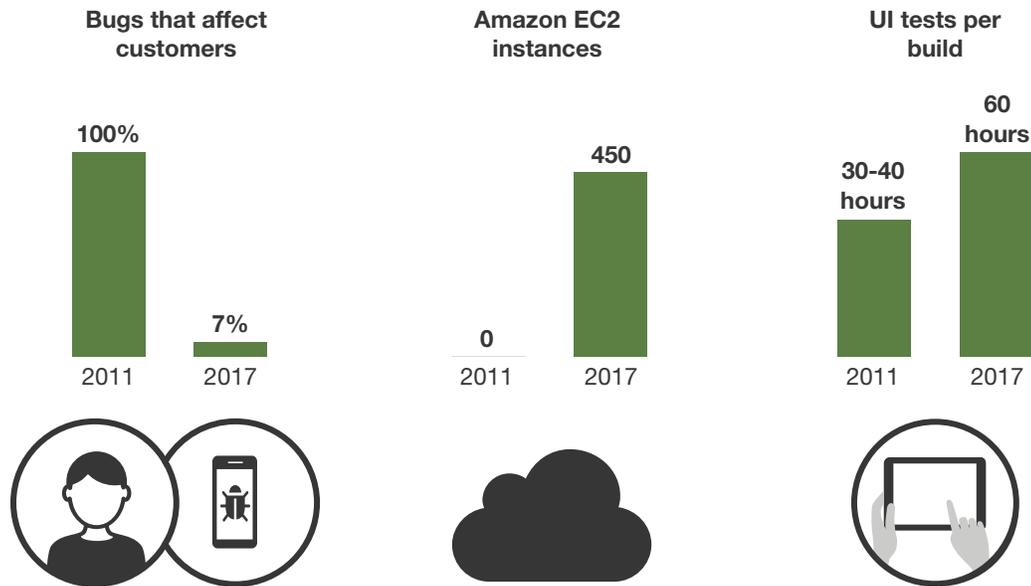
Source: Dynatrace

Results: Dynatrace's Business Transformation Delights Customers

Dynatrace has made the painful leap from an organization laboring under technical debt, with engineers devoting their time to fighting fires and resolving customer tickets, to a software company that focuses on continuous improvement. The company is reaping the benefits of happier customers and happier engineers, using its DevOps maturity to enhance product differentiation and open up new market opportunities. For example, Dynatrace now leverages its SaaS capabilities to introduce self-driving trials, simplify installation, automate upgrades, and complete pipeline analytics for customers. These capabilities derive from the people, process, and technology changes enacted under the banner of “NoOps” — an approach in which code is always production-ready, quality checks happen upstream, and operations teams have assumed new, dev-like roles. This view of development has resulted in further success:

- › **Customer bug resolution now takes hours, not weeks.** In the past, it took Dynatrace an average of five days to recreate the defect and then identify the code resolution or workaround, test it, and deploy it — a significant strain on developer productivity. The move to the cloud has given the development team immediate access to environments to duplicate, resolve, test, and deploy, so they can fix bugs within 24 hours.
- › **Automated testing and runbooks support the NoOps approach.** As part of the DevOps process, Dynatrace implemented automation across the entire pipeline, from testing to deployment. Dynatrace now runs 31,000 tests per hour, so developers get immediate feedback on code and code quality, enabling them to resolve defects while the code and requirements are fresh in their minds. The results? In 2011, 100% of bugs found in production linked to a customer ticket; Dynatrace has reduced this to just 7% by identifying and resolving customer-affecting bugs in development (see Figure 5). And once the code is ready for deployment, Dynatrace deploys it using automated runbooks that drive 500 cloud deployments a day.
- › **Customer acquisition and retention have increased.** Dynatrace leverages precise insights to better understand how its customers are using its solution and shares this information with its product management team as well as with development, support, and service teams. For example, with the transition to SaaS, Dynatrace offered a self-service trial product for new customers. Prospects could download an agent and use gamification to guide them through a trial instance of the product, which could then automatically convert into a client instance. Dynatrace was able to identify barriers to the trial such as regional bandwidth issues, which resulted in only 2% of customers successfully installing an agent. Dynatrace fixed the issue and now enjoys a fivefold increase in the number of successful installations.

FIGURE 5 Speed And Quality Go Hand In Hand



Source: Dynatrace

Recommendations

Culture And Process Are Critical To DevOps/NoOps Success

Dynatrace's team is now moving from DevOps toward NoOps.¹⁵ The company's journey exemplifies the focal points for I&O teams looking to use DevOps and NoOps to drive business transformation.

- › **Create a shared vision of quality and instill accountability in everyone.** Developers shouldn't simply code; organizations must hold them accountable for the quality of their code in production. I&O professionals also need to re-imagine the remit of their work and transition from server building and maintenance to accelerating automation throughout the pipeline. New responsibilities focus on creating reusable, scalable, cost-effective infrastructure; storage; and network capabilities. Creating a culture of accountability requires investing in an ecosystem to support this vision, including configuration automation, automated testing, feedback loops, and a consistent infrastructure environment that supports the desired velocity.
- › **Make repeatable and consistent processes the first steps to improvement.** Most organizations have silos of automation that impede transformation. DevOps professionals must tackle this roadblock by aggressively automating the pipeline, from ideation to deployment. Dynatrace's first task was to define and implement consistent, repeatable, automated processes. And don't ignore the availability and reliability of your systems, as they enable you to focus on value-delivering activities.

- › **Identify the most important metric, measure it, and improve.** DJ Patil, former chief data scientist for the US government, has a motto that every business transformation project should live by: “If you can’t measure it, you can’t fix it.”¹⁶ Once you’ve developed a repeatable process, use metrics to benchmark your progress. Dynatrace found that visibility into its continuous delivery pipeline allowed it to measure something even more important — its health — and enabled deployments into the pipeline at any moment. DevOps leaders: Identify your most critical measures, then report on them to the organization and the business to ensure alignment and continuous improvement.

Engage With An Analyst

Gain greater confidence in your decisions by working with Forrester thought leaders to apply our research to your specific business and technology initiatives.

Analyst Inquiry

To help you put research into practice, connect with an analyst to discuss your questions in a 30-minute phone session — or opt for a response via email.

[Learn more.](#)

Analyst Advisory

Translate research into action by working with an analyst on a specific engagement in the form of custom strategy sessions, workshops, or speeches.

[Learn more.](#)

Webinar

Join our online sessions on the latest research affecting your business. Each call includes analyst Q&A and slides and is available on-demand.

[Learn more.](#)



Forrester’s research apps for iPhone® and iPad®

Stay ahead of your competition no matter where you are.

Supplemental Material

COMPANIES INTERVIEWED FOR THIS REPORT

We'd like to thank the individuals from Dynatrace who generously gave their time during the research for this report.

Endnotes

- ¹ DevOps adoption has reached critical mass. Many I&O teams have embraced and mastered the key tenets of DevOps: fast, frequent releases; an automated tool chain integrated with cloud services; and a cultural shift that emphasizes shared responsibility for quality. See the Forrester report "[DevOps Heat Map 2017](#)."
- ² For more information on digital intelligence technology providers, see the Forrester report "[Vendor Landscape: Digital Intelligence Technology Providers You Should Care About](#)."
- ³ Some I&O executives are now asking what comes next. For mature DevOps teams, the next step is focusing on the full automation of their continuous delivery pipeline, as organizations are still experiencing problems with the quality of code in production. These teams need to identify and break down automation silos and shift the responsibility for the quality of code across the entire delivery pipeline, including application development, testing, security, and operations.
- ⁴ Change happens fastest when there is a dual top-down and bottom-up approach. In this case, Dynatrace's customers voiced their displeasure, creating pressure; the bottom-up move of engineers to improve the quality of releases added to it. See the Forrester report "[Faster Software Delivery Will Accelerate Digital Transformation](#)."
- ⁵ Instead of managing a whole product holistically, the as-a-service model allows organizations to leverage third-party services, mostly located in the cloud.
- ⁶ For more information on the value of application performance management and the vendor solutions available, see the Forrester report "[The Forrester Wave™: Application Performance Management, Q3 2016](#)."
- ⁷ In many organizations, screaming customers are the primary feedback mechanism. For more information on the lagging state of proactive remediation and its importance, see the Forrester report "[Brief: Embrace The Need For Speed To Avoid Ugly DevOps Practices](#)."
- ⁸ Developer-friendly APIs speed productivity and insight. Use APIs and as-a-service offerings to build your own intelligent systems on top of vendors' AI algorithms. I&O teams should also add cognitive agents to the help desk toolbox to help employees and customers return to productivity quickly. See the Forrester report "[Top Eight Technology Trends That I&O Pros Should Watch: 2016](#)."
- ⁹ For more information on the role of DevOps in continuous testing services, see the Forrester report "[Vendor Landscape: Continuous Testing Services For Agile And DevOps Environments](#)."
- ¹⁰ For more information on the capabilities of application testing in the cloud, see the Forrester report "[Improve Quality And Speed With Application Testing In The Cloud](#)."
- ¹¹ For more information on speeding up your business, see the Forrester report "[The Need For Speed: Drive Velocity And Quality With DevOps](#)."
- ¹² For an in-depth look at the value of release automation and the leading vendor solutions, see the Forrester report "[The Forrester Wave™: Application Release Automation, Q3 2016](#)."
- ¹³ For more information on how to increase application delivery speed, see the Forrester report "[Boost Application Delivery Speed And Quality With Agile DevOps Practices](#)."

¹⁴ Feature toggles are one way to include customer focus in development. This is a key investment for teams seeking to learn more about customer preferences via A/B product testing. To achieve the benefits of toggles, teams must invest in both real-time application monitoring and configuration management tools that enable feature toggles or selective deployments. See the Forrester report “[How To Fund DevOps And Spur Innovation.](#)”

¹⁵ For more information on the evolving sysadmin, see the Forrester report “[How A Sysadmin Becomes A Developer.](#)”

¹⁶ Source: Jessi Hempel, “White House Names DJ Patil as the First US Chief Data Scientist,” Wired, February 18, 2015 (<https://www.wired.com/2015/02/white-house-names-dj-patil-first-us-chief-data-scientist/>).

We work with business and technology leaders to develop customer-obsessed strategies that drive growth.

PRODUCTS AND SERVICES

- › Core research and tools
- › Data and analytics
- › Peer collaboration
- › Analyst engagement
- › Consulting
- › Events

Forrester's research and insights are tailored to your role and critical business initiatives.

ROLES WE SERVE

Marketing & Strategy Professionals

CMO
B2B Marketing
B2C Marketing
Customer Experience
Customer Insights
eBusiness & Channel Strategy

Technology Management Professionals

CIO
Application Development & Delivery
Enterprise Architecture
› Infrastructure & Operations
Security & Risk
Sourcing & Vendor Management

Technology Industry Professionals

Analyst Relations

CLIENT SUPPORT

For information on hard-copy or electronic reprints, please contact Client Support at +1 866-367-7378, +1 617-613-5730, or clientsupport@forrester.com. We offer quantity discounts and special pricing for academic and nonprofit institutions.



Dynatrace provides software intelligence to simplify enterprise cloud complexity and accelerate digital transformation. With AI and complete automation, our all-in-one platform provides answers, not just data, about the performance of applications, the underlying infrastructure and the experience of all users. That's why many of the world's largest enterprises, including 72 of the Fortune 100, trust Dynatrace to modernize and automate enterprise cloud operations, release better software faster, and deliver unrivalled digital experiences