2016 State of DevOps Report has landed

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Our State of DevOps Report has become a much anticipated event, with many of you asking us over the past few months when the next one will be published. **Looking back on the past five years, it's amazing to see how many organizations** have adopted DevOps practices and are getting real results. We hear stories from our customers all the time about how DevOps is transforming not just their business, **but also their lives. We're so** grateful to everyone (all 4,600 of you) who shared your **experience in this year's survey. Thanks to you, we have some incredible findings to share, so let's get to it.**

Every year, we look at IT performance to see how high-performing organizations compare to the rest of our sample population. This year, we found that high performers are accelerating away from the pack in terms of throughput. They deploy 200 times more frequently, which means deploying multiple times per day on demand, versus just a few times per year. High performers also have 2,555 times faster lead times, which means they can deploy a change in less than one hour compared to once every few months. We found that the high performers also continue to maintain high levels of stability — they have a three times lower change failure rate and recover from failures 24 times faster.

Throughput and stability matter, because when you're able to deploy more frequently, you can experiment more and deliver value to customers faster. Instead of having one or two chances per year to get it right, you have multiple opportunities to validate your ideas, gather customer feedback, learn, and improve. By speeding up your delivery, you can increase your rate of learning.

Speed without stability causes other problems, though: Websites and other services **break, disappointing customers, suppliers and fellow employees. However, as we've shown year after year, moving faster doesn't have to come at the expense of** stability, reliability, security, or quality. In fact, DevOps practices — for example, version control for all production artifacts, deployment automation, and automated testing — actually predict IT performance, which in turn predicts organizational performance.

By segmenting survey responses according to whether respondents' organizations are high, medium or low performers, we've been able to compare these groups across different dimensions to see whether their attitudes, behaviors, and practices are substantially different from each other. For example, we wondered if high performers had higher employee engagement, and learned that yes, they were 2.2 times more likely to recommend their organization to a friend as a great place to work, compared to low performers. Everyone wants to be part of a winning team, and those who do feel their teams are winning tend to be more engaged and loyal. Other studies have shown that employee engagement correlates with better business outcomes, such as higher customer engagement, revenue growth, and stock market performance.

A big **focus of this year's report was looking at the entire product development** lifecycle, starting with the initial product or feature idea, and extending all the way to the customer, where that idea can deliver value. We found that when product teams take a lean-manufacturing approach to product design and delivery — decomposing features into small batches, making the flow of work visible throughout the delivery process, and using customer feedback to inform product design — both IT performance and organizational culture improve.

Another key idea that DevOps borrows from the lean movement is "shifting left," or identifying and fixing defects early on, rather than inspecting quality at the end. By **shifting quality to the left, you're able to detect problems earlier when it's much** cheaper and easier to fix them. This in turn leads to less unplanned work and rework later on. We found that high performers spend 22 percent less time on unplanned **work and rework than low performers, and as a result, they're able to sp**end 29 percent more of their time on new, value-adding work. That's a great investment of team time.
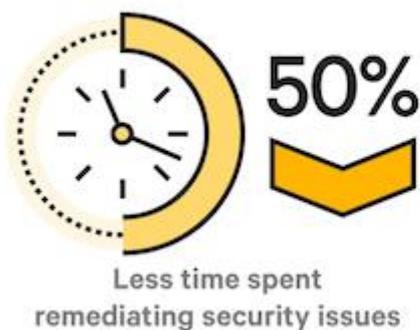
Quality isn't the only thing shifting left. DevSecOps, rugged DevOps, or whatever you want to call it, is all about integrating security early and often throughout the software development lifecycle. That means treating security concerns as a design constraint, getting continuous feedback from the security team, and building security requirements into the automated testing suite. We found that high performers spend 50 percent less time remediating security issues than low performers, because they

integrate security testing and controls into the daily work of development, QA and operations.

We'd like to thank our partner, DevOps Research and Assessment (DORA), as well as our awesome sponsors: Atlassian, Automic, CA Technologies, Hewlett Packard Enterprise, IT Revolution, Splunk, and ThoughtWorks.

We're all very excited to finally be able to share the 2016 State of DevOps Report with you. Check out a sneak peak at our 2016 State of DevOps Report infographic below, and click on the image to be taken to the full infographic for more quick stats. Don't miss the the full report, though — it's jam-packed with ideas and inspiration for launching DevOps in your own workplace.

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High-performing teams deploy more frequently and have much faster lead times.

200x — 200x more frequent deployments

2,555x — 2,555x shorter lead times

They make changes with fewer failures, and recover faster from failures.

3x — 3x lower change failure rate

24x — 24x faster recovery from failures

50% — Less time spent remediating security issues

High-performing teams spend less time fixing security issues.

That's because they address security at every stage of the software development and delivery cycle, instead of retrofitting security at the end.

The state of DevOps in 2016


[Mike Kavis](#)

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Puppet recently published its annual [State of DevOps report](#). Previously, its 2014 report revealed that DevOps was becoming [widely accepted in the enterprise](#). The 2015 report explained that as enterprises become more mature with DevOps, they become [higher performing](#) and release software more frequently with better quality. **This year's report has expanded the research to include employee loyalty, security,** and lean product management.

Key findings

- High-performing organizations are decisively outperforming their lower-performing peers in terms of throughput.
- High performers have better employee loyalty, as measured by employee Net Promoter Score (eNPS).
- **Improving quality is everyone's job.**
- High performers spend fifty percent less time remediating security issues than low performers.
- Taking an experimental approach to product development can improve your IT and organizational performance.
- Undertaking a technology transformation initiative can produce sizeable returns for any organization.
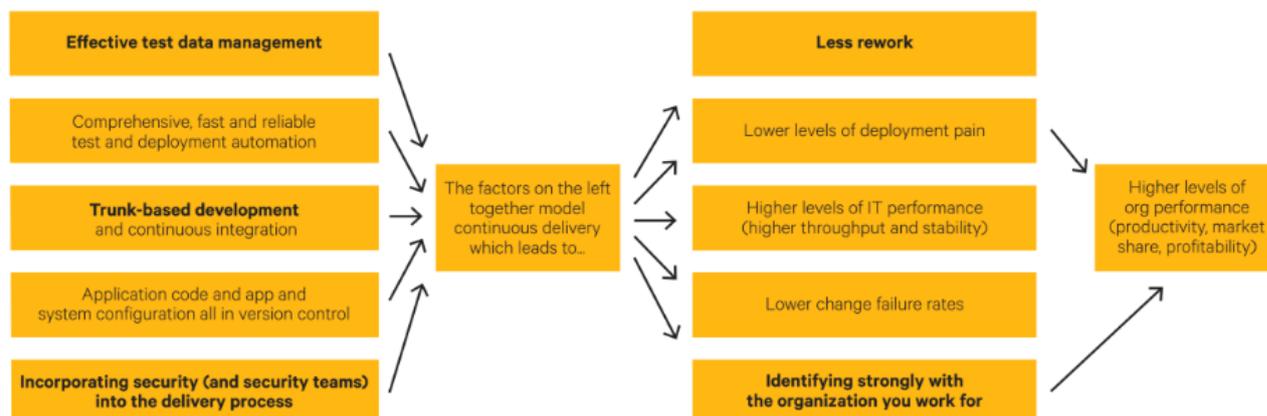
My take

I have recapped the last three State of DevOps reports. Since the first of those reports, I have been working on DevOps initiatives with several large enterprises. Each year, the DevOps report goes deeper with its findings because enterprises are getting more mature with DevOps. I see the same thing in the consulting business. **Customers in 2014 were asking "What is DevOps?" In 2015, they were asking for** help with continuous integration (CI) and continuous delivery (CD). In 2016, I am seeing clients ask about DevOps transformation. They have come to understand that DevOps is bigger than automation and that they must evaluate their legacy processes and organization structures. What has changed since last year? In my opinion, there are two major forces that are causing enterprises to look at the bigger picture.

C-Level adoption of DevOps

Over the last few years, most DevOps initiatives have been grassroots driven. Development has been looking for a better and faster way to ship software, while operations has been looking for more reliability and less firefighting. DevOps has provided the opportunity to satisfy the needs of both groups. Grassroots initiatives have sprung up everywhere. Small teams have started drastically improving their overall performance, which has driven up interest across other teams. In many cases, enough momentum and results have been achieved that the C-level suite has taken notice.

As much as the C-level loves the results these teams produce, they have become concerned with security and lack of consistency. One of my clients had four different teams implement CI/CD, each in its own specific way and with its own suite of tools. Sure, it was great that they were getting code out the door quickly, but nobody knew if it was secure, compliant, or auditable. The other concern the C-level had was scalability. How could they scale DevOps across thousands of developers if there were four different ways to do it?

Grassroots initiatives are great for innovation and bringing DevOps into an organization, but in order to scale, DevOps must be driven from the top. The grassroots initiatives mostly focused on software builds and automating infrastructure. But to truly move the needle, enterprises must look beyond automation and improve the entire SDLC from project inception to customer service. DevOps is bigger than tools.

Need for speed

The other big driver for the C-level is agility. Every industry is being disrupted by fast-moving companies, often startups, that are chipping away at market share with modern cloud architectures and agile delivery capabilities. C-levels are looking to cloud computing and DevOps as the way to become more agile to compete in the new age of computing.

Large enterprises are burdened with more constraints than young startups. They are buried in legacy technologies, processes, and cultures. Many enterprises are highly regulated and have auditors, Wall Street, and the press breathing down their necks each day. To make DevOps work in the enterprise is far more challenging than in a startup or SMB.

In order to get to market quickly, enterprises must find a way to reduce the massive numbers of meetings, reviews, processes, and bureaucracy that have evolved over time. I have seen a number of clients become really good at automating their build and deployment processes only to find out that it still takes forever to get code out the door. The reason for this is that they worked within their silo to improve their processes, but are still constrained by all the waste in the processes that come before and after their build. It is great that they can turn a business request around in a week, but if it still takes another two to four weeks to make it to production, there is little value to the business.

The DevOps report addresses these issues head on. Let's discuss a few of these findings.

Security and testing must shift left

Two findings support the shift-left initiative. The first one is "everyone owns quality." In the old days, the dev team threw code over the wall to the QA team, who got blamed for any and all defects that made it into production. This failed model must die. With DevOps, quality must be built in from the start. In order to automate the build and deployment process, testing must be automated as well. Test automation is a major component of CI. One of the guiding principles of CI is that defects should be caught in the build process and not be allowed to flow downstream.

Quality is not only a software issue. One of the biggest quality issues is the lack of consistent environments. That is why infrastructure automation and infrastructure as code becomes so important. It doesn't matter how good the test automation or

testing resources are if the production environment is configured differently than the development and testing environments.

Another key finding was "high performers spend fifty percent less time remediating security issues than low performers." For high performers, security is an integral part of CD. High performers include security from sprint 0 as opposed to holding security reviews late in the lifecycle. Security controls and policies are also baked into the infrastructure, and security scans are run during the build process. Just as quality is everyone's job, so is security.

Lean and culture

The report also covered lean product management and culture transformation. To me, these two areas are what make and break a true DevOps initiative. Companies that think DevOps means automating the CI/CD pipeline are missing the boat. CI and CD are definitely valuable, but by themselves, they do not deliver the business value that DevOps promises.

If you have ever read Goldratt's The Goal, you will be familiar with his take on bottlenecks. He recommends that after you remove a bottleneck, you find the next bottleneck and continually optimize the overall system. CI/CD addresses two bottlenecks: the build and deployment processes. Unfortunately, companies often have several other bottlenecks that are not technology related that never get addressed. For example, I have many clients that have anywhere from two weeks to three months of legacy processes that must be performed to initiate a new project. Tasks like getting project IDs created and entered into tracking systems, gaining approvals and credentials, architecture and security reviews, and others must be completed before a lick of code can be written.

Once the code is completed and ready to ship, another series of (usually manual) processes such as review gates, additional testing, DR planning, compliance checks, etc. add more wait time to the project.

This is where lean and culture change come into play. Many of these processes were put into place because releases were historically performed quarterly or biannually within large, monolithic applications. The risk of change in a large change set over an extended period of time is very high. The new model is to perform smaller changes more frequently. It is easy for a development team to embrace the new model, but if the rest of the organization is not on board, the dev team is still constrained by the legacy processes.

For a grassroots DevOps initiative, it makes sense to focus on the area of build and deploy. To become an agile, high-performing company, DevOps must be driven from the top down. The scope needs to expand to addressing the people, process, and technology bottlenecks across the entire SDLC and business. At scale, DevOps is bigger than dev and ops.

Summary

The State of DevOps report is the most comprehensive and quantitative research about DevOps on the web. If you review each of the last three annual reports, you will be able to see how enterprises have matured greatly over time. I believe a majority of enterprises have reached the understanding that DevOps is not just IT automation. DevOps is all about enabling an enterprise to become high performing and competitive in a world in which speed wins.

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