

WHITEPAPER

How GitOps Boosts Business Performance: The Facts



INTRODUCTION

As cloud-native applications have become more prevalent, the concept of DevOps has changed the way software is developed. It makes sense. By giving developers the autonomy to deploy their own code and make infrastructure changes with minimal intervention from Ops, organizations naturally become more productive. They deploy code more quickly and bring new features to market faster, establishing a clear competitive advantage with an increase in innovation. This positive effect is not limited to the performance of engineering teams. Technology, in particular cloud native technology like Kubernetes and its ecosystem of projects, is now a core competency for organizations in all industries, from manufacturing and banking to retail and travel. Every business must innovate to survive. Every company is a technology company now.

Yet, like all approaches to software development, there is more than one way to implement DevOps. As the DevOps Research and Assessment group (DORA) found in their recent report, **'Accelerate: The State of DevOps 2019'**, there are significant gaps between the world's best-performing organizations and the worst.

The report is the latest installment in the largest and longest-running project of its kind, pulling together six years of data drawn from over 31,000 technology professionals worldwide. It charts the performance of engineering teams across the world against four key measures: lead time for new features, failure rate of code changes, frequency of deployment and the time it takes to restore service following an outage.

In this white paper, we'll explain the best way to achieve the results achieved by the best performing organizations.

GitOps: the best way to do it

GitOps is a set of best practices and operating models for managing cloud native technologies that together make the promise of DevOps easier to realize. Created for a cloud-native world, GitOps makes developers more productive while improving application stability, security and compliance – and it does all this without the need for developers to learn new tools.

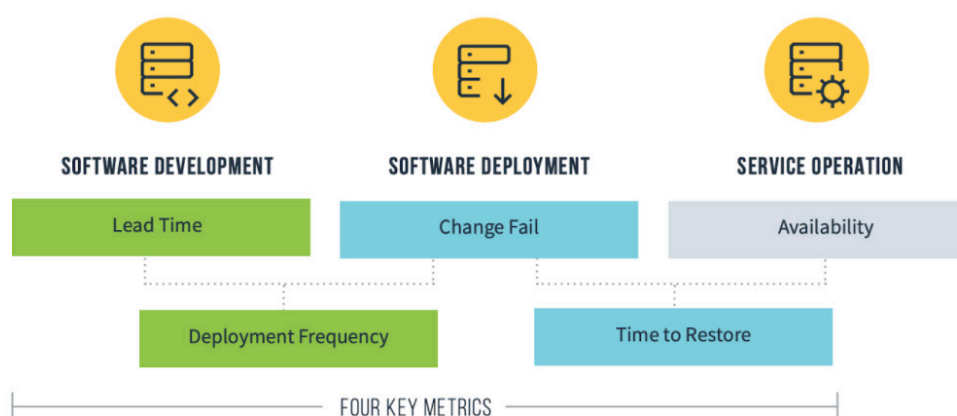
On the pages that follow, we'll explain exactly what GitOps is and how you can use it to deliver positive results in your organization.

SOFTWARE SUCCESS LEADS TO OPERATIONAL SUCCESS

In publishing its latest report, DORA has done more than simply measure the impact of DevOps practices. It has identified four key performance indicators that correlate positively with profits and market share. This link is so strong because in practically every modern sector, businesses now depend on their ability to create and operate software to achieve their goals.

Velocity equates to competitive business success

DORA research shows that organizations with the best velocity on four key measures are twice as likely to meet their organizational goals.



The four measures are referred to by DORA as measures of Software Delivery and Operational (SDO) performance and are metrics where elite and high performance excelled:

1. Deployment frequency

DORA found that the world's best performing businesses deploy many times a day – from around 50 times up to thousands of times for tech giants such as Amazon. Low performing businesses report correspondingly low deployment frequencies, ranging between once a month and once every six months.

2. Lead time for code changes

This metric refers to the average time from check-in to production release. Businesses that perform best against this measure report average lead times of less than a day. Businesses that are not performing well reported an average lead time of between one and six months.

3. Time to restore service

This is defined by DORA as the average time from the detection of a user-impacting incident to its remediation. In the best performing organizations, the average time was under an hour. At the low end of the organizational performance scale, it could take between a week and a month for such outages to be fixed.

4. Change failure rate

This can be seen as a measure of quality in the release process. The best performers in the DORA study reported a change failure rate of less than 15%, while the low performers experienced much higher rates, ranging from 46% to 60%.

How the best performing teams compare with the rest

Across the organizations it studied, DORA identified huge differences in performance between the very best teams and their less successful counterparts.

SDO Measure	Elite	High	Medium	Low
Deployment frequency	On-demand (multiple deploys per day)	Between once per day and once per week	Between once per week and once per month	Between once per month and once every six months
Lead times for changes	Less than one day	Between one day and one week	Between one week and one month	Between one month and six months
Time to restore service	Less than one hour	Less than one day	Less than one day	Between one week and one month
Change failure rate	0-15%	0-15%	0-15%	46-60%

A surprise: speed and stability support one another

Combining the first and second SDO measures (lead time and deployment frequency) provides an indication of throughput. Combining the third and fourth (time to restore service and change failure rate) gives an indication of stability.

These two concepts – speed and stability – might be expected to represent a trade-off. On the contrary, DORA's data shows businesses that perform well in one tend to perform well in the other.

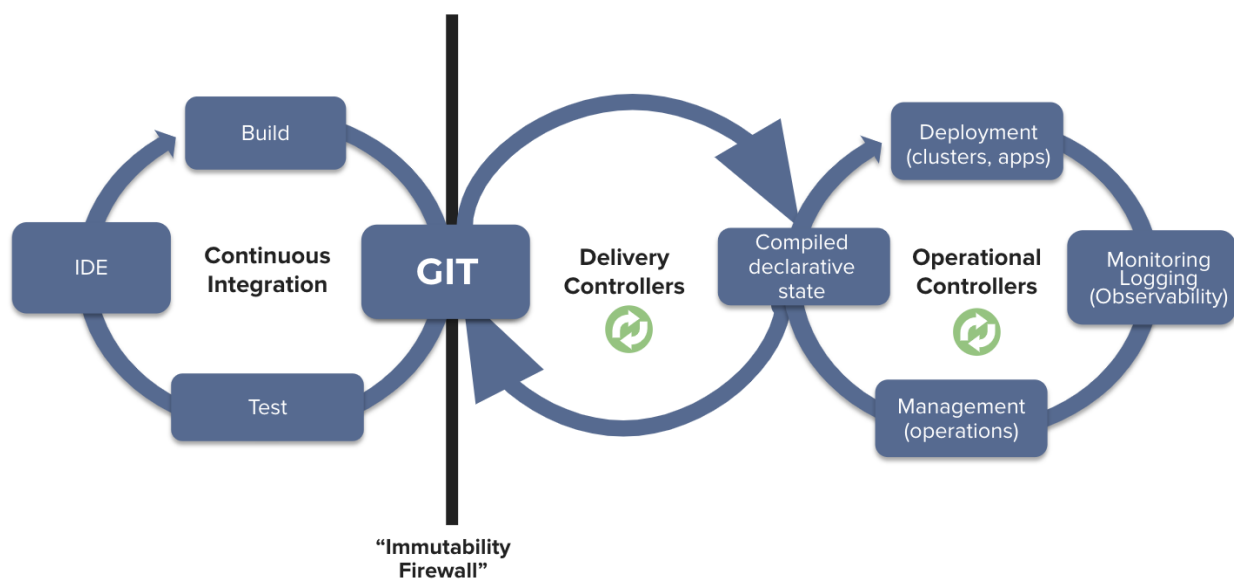
Moreover, businesses that scored highly on SDO performance were found to perform well in terms of profit and market share, while for businesses that did not, the inverse was true. In short, SDO performance correlates with business success.

WHAT IS GITOPS?

GitOps is a set of best practices and an operational model that reduces the complexity of Kubernetes and makes it easier to deliver on the promise of DevOps. More than a simple evolution of DevOps, GitOps builds and iterates on the ideas of Martin Fowler and Infrastructure as Code. It is based on the idea that if you can treat everything as code – from the application code itself to the underlying infrastructure and configuration – you can keep it in version control. This means the desired state and any changes of an entire application stack from the container cluster upwards are kept under source control. Any divergence from this desired state can be then observed and alerted on straight away. And if the worst happens, the entire cluster can be rolled back and rebuilt with ease.

The simplest way to implement GitOps is to use Git, since it already includes many advantages such as built-in security guarantees with full audit trails. Another key concept behind GitOps is the fact that Kubernetes and its ecosystem of cloud native tools are **declarative, as opposed to imperative**, which allows for configuration to be treated as code. It is this declarative nature that enables the infrastructure to be held in Git alongside application code.

GitOps – An Operating Model for Cloud Native



This built-in observability allows for fast iteration and experimentation, and allows development teams to make crucial decisions before they deploy new features. Features or other updates like cluster configuration can be pushed to Git and then observed in real-time – and rolled back if necessary. This means teams can deploy and make changes to the infrastructure with confidence.

No new tools to learn

Because Git lies at the centre of the delivery pipeline, developers do not need to learn to use new tools. They can work in a world they know, using pull requests to accelerate deployment and operations tasks. The benefits for development teams include increased velocity and improved system reliability.

Increased velocity with GitOps

GitOps goes further than any other set of tools or practices to realize the potential of DevOps. By automating so much of the operations overhead, it not only speeds up both development and deployment, but it also speeds up the detection and remediation of problems, which in turn boosts availability.

This is achieved by using Git as the record for the desired state, alongside purpose-built software agents (the backbone of the [**Weave Kubernetes Platform**](#)) and the automation already built into Kubernetes. But this increase in deployment velocity needn't mean relinquishing control. Far from it. By recording every change that is made in Git, from code commits to production configuration changes, GitOps provides a full audit trail. At any point, you can see exactly what changes were made, when and by whom.

The key benefits of GitOps

GitOps delivers much more than just increased velocity. It offers numerous benefits that can impact directly on the factors identified by DORA as key influences on business performance.

1. Increased productivity

Mean time to deployment is reduced significantly, thanks to continuous deployment automation and an integrated feedback control loop. The results are transformative: teams can ship 30-100 times more changes per day, increasing overall development output by 2-3 times.

2. Familiar developer experience

Because GitOps is based on tools already familiar to developers (like Git), they can manage updates and introduce new features more rapidly without expert knowledge of how Kubernetes works under the hood. New team members get up to speed faster and become productive much sooner.

3. Audit trails for compliance

By using Git workflows to manage all deployments both infrastructure changes and code, you automatically generate a full audit log of all cluster changes made outside of Kubernetes. In short, it tells you who did what, and when. These audit trails can be used to meet SOC 2 compliance, as well as making management easier.

4. Greater reliability

Because your entire system is in Git, you can easily manage rollbacks, reversions and forks – which means GitOps gives you stable and reproducible rollbacks of your entire application infrastructure. With the whole system described in Git, you also have a single source of truth from which to recover from disaster, reducing mean time to recovery (MTTR) from hours to minutes.

5. Consistent workflows

GitOps has the potential to provide a single, standardized model for amending your infrastructure, your apps and Kubernetes itself, right across your organization. Not only will all your CI/CD pipelines be driven by pull request, but operations tasks will also be fully reproducible through Git.

6. Stronger security guarantees

With strong cryptography to track and manage changes, plus signed changes to prove authorship and origin, Git already offers powerful security guarantees for application code. By applying that security to the definition of your entire stack from the containers up, you can secure the whole development pipeline.

HOW GITOPS IMPROVES SDO PERFORMANCE

DORA's findings make it clear that when DevOps is implemented properly, both speed of development and stability of applications are improved. This in turn correlates directly with organizational success: profitability and market share.

Yet not every business gets it right. In a cloud-based world, software development, delivery and maintenance is a complex process. DevOps improves success enormously, but there remains room for failure.

GitOps is, in essence, just a modern way of implementing DevOps. But the unique benefits it brings impact directly on DORA's SDO performance measures like an increase in deployment frequency, less lead time for changes, less time to restore service and a decrease in change failure rates.

What's more, GitOps removes much of the complexity of developing on and managing Kubernetes. So not only does it help organizations improve their performance, but it makes it easier for them, too.

The team at Mettle, a business finance app created by the innovation arm of Britain's NatWest Bank, used GitOps to increase speed of deployment by 50%. Meanwhile, the time it takes to restore service has been cut drastically. They can now destroy a cluster and create a new, identical one from scratch, all in just 20 minutes. You can [download the full case study here](#).

In short, GitOps makes DevOps success easier to achieve. Looking at each of the SDO measures in turn, here's how it does it.

Deployment frequency is higher with GitOps

A central benefit of GitOps is improving developer productivity. By giving application developers access to a GitOps-based platform, they can use familiar tools and workflows (like pull requests) to optimize their efficiency. And because security and compliance are baked into the process, there is no need for them to slow your developers down.

GitOps gives developers a self-service model, enabling them to write, integrate and deploy code faster. For Mettle, this shift to a true self-service model reduced the time developers had been devoting to operations by 75%. This unprecedented level of autonomy also helps reduce lead time – the second of DORA's SDO measures.

Lead times are reduced with GitOps

By enabling developers to work independently, GitOps makes them more productive, shortening lead times – defined by DORA as the time taken from completion of code to its deployment into production.

GitOps gives developers responsibility for their own configurations, application configuration values and topology, while the operations team manages platform-wide configurations for policies, security and compliance, ensuring the guardrails are in place. The role of the ops team is therefore to focus on enabling the development teams, maintaining security, compliance, resilience, and cost efficiency of the platform and process.

Change failure rate is lower with GitOps

To reduce the incidence of failures, safety nets must be introduced to catch them before problematic code makes it into production.

GitOps introduces key safety nets. With the entire state of a running application held in version history, teams can deploy more frequently in the knowledge that deployments can be rolled back quickly and easily.

As well as reducing failure rate, these two safety nets help increase deployment frequency, the first of DORA's SDO measures.

Time to restore service is reduced with GitOps

The final measure that DORA linked to business performance was the time it takes to restore service following a failure – in other words, mean time to recovery (MTTR).

GitOps is based on reproducibility, reducing both MTTR and the change failure rate (see above). This is because the entire system is being versioned in Git continuously, while reconcilers ensure that what is deployed matches that desired state at all times, preventing drift.

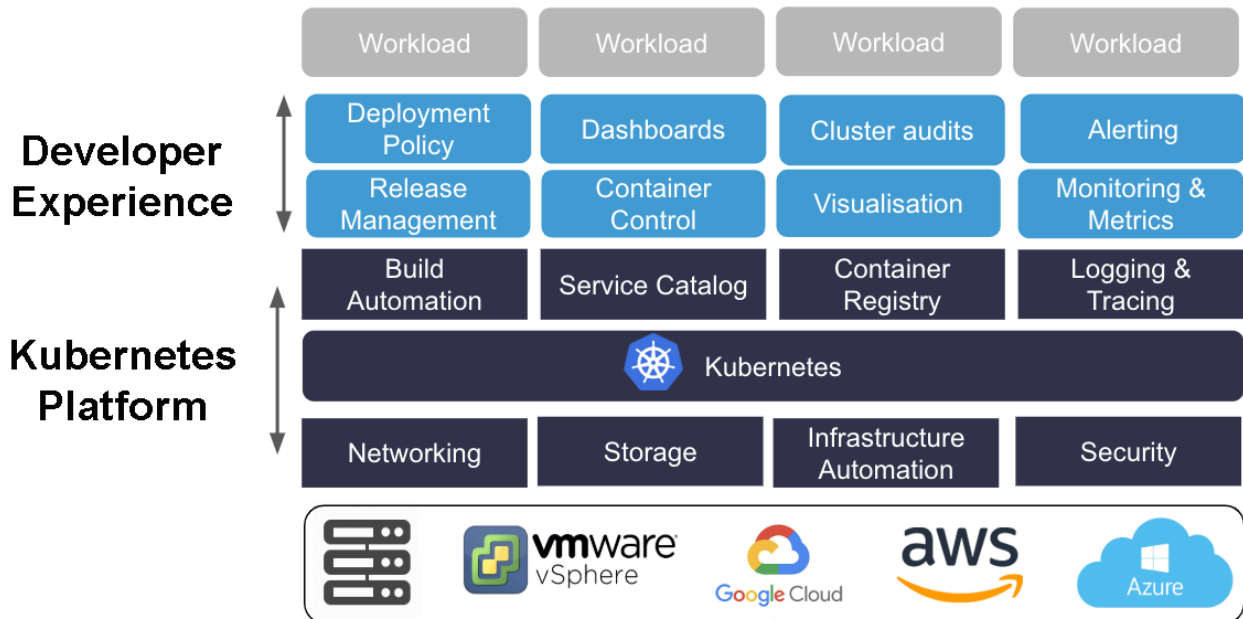
The fifth DORA metric: availability

This year, DORA added a fifth SDO metric to its study: availability.

Availability is typically delivered via redundancy, which is significantly easier to achieve using GitOps. By storing all configuration data in Git, organizations can consistently deploy identical and complete Kubernetes Platforms to different environments, whether on-premise, in the cloud or in different datacenters. Essentially, scaling up and out becomes easier, faster and less error-prone and more reliable. By drastically reducing the time taken to restore service in the event of a problem, GitOps promises much-improved availability for organizations of all kinds.

Getting there with the GitOps pioneers

The most straightforward way to implement GitOps is to adopt the Weave Kubernetes Platform (WKP), provided and supported by Weaveworks, the inventors of GitOps.



WKP is a production ready platform with GitOps as the underlying architecture and developer experience. It simplifies cluster configuration and management across your organization by bringing together all the tools, services and components that your teams need to operate and develop on Kubernetes into a single platform. WKP provides policy and Git-based rules to specify, audit and control who can change what in the cluster configuration and guarantees stability, resilience wherever Kubernetes is needed on-premise, in the cloud or at the edge.

To see WKP in action, [watch the demo here](#).

CONCLUSION

The requirement to deliver software features faster is not limited to the technology industry. The findings in the DORA report held true regardless of sector. So whether you're in financial services, a manufacturing firm, a publisher or a retailer, DORA's SDO measures will almost certainly correlate with profitability and market share in your sector. Find a way to perform well against those measures and your business will benefit directly. Given the clear assistance GitOps can provide with DORA's measures, we conclude that GitOps can help you improve performance, whatever business you're in.

The most straightforward way to introduce GitOps to your organization is by enlisting the help of Weaveworks. Whether you run your operations on premise, in the cloud or on hybrid architecture, Weaveworks offers a range of GitOps technologies and services, led by the Weave Kubernetes Platform (WKP).

To learn more about WKP and how you can implement GitOps in your organization, visit weave.works/wkp or contact the [Weaveworks sales team](#).