DevOps Is More Than Using Fancy Tools.

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1 Introduction

You have probably heard the term DevOps used on Twitter, or read about it on Medium, but you were never quite sure what it actually meant. DevOps stands for Development (and) Operations, and is a term used to talk about the bridging of software development and the operation of the product both in terms of organisational culture and software tools.

What this means in practice is having agile infrastructure that makes it fast to deploy changes in your software to your production environment. The big ideas around DevOps tooling are what is known as Continuous Integration and Continuous Delivery. Integration means your code is always being pushed to the central repository and tested. Delivery is about delivering your central repository out to your users in a quick yet safe way. Continuous is the fact that this should be happening constantly with as little manual interaction as possible.

There is more to DevOps than tooling though as you will soon learn. Making changes in your organisations culture is another critical aspect of DevOps that will make your engineers feel ownership of your product and increase productivity (Puppet 2015). This is regarded as one of the most important aspects of DevOps and is easily overlooked by software engineers who think they "do DevOps" because they set up a continuous integration tool.

DevOps is best implemented at an organisational level but does take time for that to happen, so we will look in to some methods of implementing DevOps at a smaller scale starting with your team. In this article we will look in to why you should use it, how industry uses it, and then how you can start implementing the cultural improvements yourself.

2 Benefits

So why should you start using DevOps? Is it really worth trying to change how your company operates at an organisation level? Yes, and we will show you why. Luckily DevOps is one of the more researched topics in the tech sector lately, so there is a lot of real-world information regarding how it can benefit your company.

The State of DevOps Report from 2015 shows clear benefits to your team and organisation by adopting the DevOps culture and way of collaborating. The report states that IT teams utilising DevOps have up to 30x more frequent deployments, 60x fewer failures, 60x higher change success rate, and 160x faster recovery. More importantly, they are twice more likely to succeed in profit, market share, and productivity goals (Puppet 2015).

Value is delivered faster with a DevOps-improved development cycle and there is no easier sell to your higher-ups than this fact. The cultural benefits are also great for your teams, resulting in higher employee engagement, greater professional development opportunities, and happier, more productive teams (Puppet 2016).

DevOps Digest collected feedback from senior DevOps professionals that stated the following benefits. The alignment of IT and business, putting the business needs on the forefront of the software development to realise business goals by shortening feedback loops and putting the customer needs first (DevOps Digest 2016). Velocity is also stressed as a key benefit of DevOps – it is not enough to just develop products; they must be the right products that are in the right direction of what the customers need.

2.1 Scenario

To truly show some of the benefits of DevOps let us discuss fictional Company X. Company X is a software company that creates a widely used web application for tracking the location of cute dogs. They have hundreds of thousands of concurrent users and millions of users per day. Jeffrey is an engineer in the front-end team of Company X that just pushed the final commit on a new feature.

2.1.1 Without DevOps

Jeffrey forgot to run the tests on this commit but he ran them on the previous one and everything was fine, so he wasn't worried. At the start of the next week the branch he was working on was approved by the team lead and merged in to the master branch. Later that afternoon the new version of the product was built after some delays getting all the branches in properly. It took so

long that they had to wait until the following day to push it out to the live servers.

Several hours later and Company X's twitter was under fire with a lot of tweets complaining about crashes in the latest update. Jeffrey was made aware there was a problem six hours after the update went live by the social media team and went to work on figuring it out. He discovered the source of the bug was in the code he wrote the previous week but it was in the database that he was not too familiar with. He sent an email to his colleague who worked in the back-end team but he was busy so Jeffrey had to wait an hour. After the colleague was free they came together and quickly patched the bug, making sure to run the tests this time. The update was rushed in to production a couple of hours later after getting approval from the team leader and later the build team. It was a long day.

2.1.2 With DevOps

Jeffrey's commit triggered the automated tests on the test server to start and within 30 seconds he knew something was wrong, a couple dozen tests were failing. He realised it had something to do with an API call to the server he made. Luckily Jeffrey had recently gone to a training day event that encouraged employees at Company X to develop skills outside of their direct role, so he knew how to fix it.

After applying the fix and getting all green on the test suite the new commit was automatically applied to the master branch and the build process was started, all without any input. The build went live within half an hour and users began tweeting about how cool the feature was. Jeffrey had completed the task several days earlier than expected so he could now go to work on helping out his team mates with an issue that the metrics had alerted them of.

3 Industry

The software development industry has known these benefits for a while now and DevOps is currently embraced by more and more companies each year (Puppet 2015, Puppet 2016). A report Atlassian commissioned in 2017 from xMatters found that roughly 41% of companies were embracing and practicing DevOps, but that around 60% of companies were not utilising DevOps or whose employees were not aware if they were (xMatters 2017).

The report defines five categories that make up DevOps and then stages from pre-DevOps base to DevOps expert:

	BASE	BEGINNER	INTERMEDIATE	ADVANCED	EXPERT
CULTURE AND ALIGNMENT	Siloed roles	Planning cultural change	Implementing cultural change	Removing boundaries	Sharing tools
OPERATIONS AND SUPPORT	Customers report incidents	Static on-call schedules	Auto-routing alerts	Communications across toolchains	Integrated issue tracking tools
CONTINUOUS DELIVERY	Code to prod every 6 months	Code to prod monthly	Rolling updates	Feature branch development	Trunk-based development
DESIGN AND ARCHITECTURE	Undefined platforms	Standardized platforms	Configuration as code	Performance scale testing	Infrastructure as code
TEST AND VERIFICATION	Manual tests	Automatic integration tests	Automated deployment	Automatic acceptance tests	Experiments in production

The report goes on to find that of companies who do practice DevOps, the majority (54.2%) were well developed in culture and organisational alignment rating at advanced or expert level. This is in contrast to the more technical side of DevOps where the majority of companies were in the beginner or intermediate phase as defined by Atlassian.

Culture and organisational alignment does not simply fit in to a small set of criteria though. While they found more than 80% of companies were sharing tools between operations and development, they found that the flow of information between teams was poor and rated most companies at a beginner level. This is an important factor that must be further developed to build a truly rich DevOps culture within your organisation.

3.1 Examples

Now we know how the industry as a whole has embraced DevOps let us have a look at some more specific examples from some of the bigger names in technology. The way DevOps is utilised can change radically between companies as the needs and interpretations of the concept differ.

3.1.1 Netflix

Dave Hahn, a Senior Site Reliability Engineer at Netflix said "How does Netflix think about DevOps? Well the truth is, we don't. [...] The result of the Netflix culture looks a lot like DevOps" (Netflix 2018). Netflix wears their unique culture openly and with pride. They encourage employees to make decisions independently, share information freely among all levels of the company, and to be "extraordinarily candid" with one another to allow as much openness between teams as possible (Netflix 2019).

Netflix sees DevOps as an ideology that offers freedom and creative flexibility to get the job done with trust. It is not a set of tools and patterns that can be applied to their technology, but rather a cultural phenomenon that inspires and motivates their engineers to be their best. The operations

engineers at Netflix develop tools that make it as seamless as possible for software developers to push to production, without having to worry about instances or operating systems or configuration files.

3.1.2 Atlassian

Meanwhile at Atlassian, DevOps is "a culture and environment where building, testing, and releasing software, can happen rapidly, frequently, and more reliably" (Atlassian 2016). They say that DevOps is not the sole responsibility of one person, but a shared responsibility on the entire team. Atlassian achieves the shared responsibility by including all disciplines in the feedback, plan, and build stages.

Culture is so important to Atlassian that they consider it the number one success factor in their business (Atlassian 2016). It is no surprise then that their core business-to-business products either facilitate or work well alongside a strong DevOps culture. Atlassian even provides guides to start the conversation around and further develop your teams DevOps skills, among other team building skills, in what they call the Team Playbook. This is a great entry point to jump in to if you and your team are unsure where to start.

3.1.3 Lyft

Ride share company Lyft also utilises DevOps, by using their DevOps engineers to "[drive] consistency across all of Lyft's services to create an environment that allows their developers to work autonomously. They call this "Scaling DevOps" (Saltstack 2015). Lyft reiterates the concept of making developers responsible for the work they are creating under the "if you build it, you run it" philosophy. What this means is the person who creates something is also responsible for getting it to run in the production environment, ensuring a sense of ownership while building cross-disciplinary skills.

3.2 Analysis

Now that we have a few examples of how industry thinks about and implements DevOps we have identified some common themes. DevOps in industry is defined as a shared cultural and tooling mindset that focuses on productivity and ease of release by empowering developers to take ownership of their product and feel like they are genuinely contributing to the products success.

As the majority of businesses surveyed are strong on the cultural side of DevOps this proves it is attainable and a great point to start with in your organisations DevOps journey. Opening up

communication will prove to be a powerful start in consolidating tooling and information among your teams.

4 How

So how do you start implementing DevOps in your organisation? Here are some ways you can start developing the culture of collaboration and ease of development that we now know is fundamental to DevOps success.

4.1 Open Communication

Atlassian has many guides freely available that they call the Atlassian Play Book, and each "Play" is a guide for how to prepare for and facilitate a meeting to build some particular skill. There is a series of Plays they have organised in to what they call "Building a DevOps culture" (Atlassian 2019).

As a rough summary "Building a DevOps culture" starts with learning about your team, identifying everyone's roles and clearly defining what they are and what each individual might need to do that job. It is then followed by a meeting to discuss or create team values, practices and the expected behaviour among the group. Risks are then analysed for your next project and paths identified to work around any issues your team foresees. Finally they encourage the use of post-mortems that identify what worked well and how the team as a whole can improve.

Intentional meetings are a great way to develop the culture at your organisation by allowing every team member to voice their thoughts and update the rest of the team with what is going on and how they are doing things. Increased communication through this style of meeting will lead to an increased shared understanding of your products and the tools that are being used. By empowering your developers to know they are contributing and improving themselves this will snowball to the rest of your organisation once the benefits are shown.

We strongly recommend trying this series of Plays in your workplace to get everyone on the same level and improving communication skills in your local team. If it works for you, you can start getting other teams on board in developing an open DevOps culture within your company.

4.2 Own Your Work

TechRepublic recommends integrating the teams within your organisation to create an environment open to collaboration on an equal field, with common goals (TechRepublic 2018). The key to creating

this environment is making sure everyone understands they are responsible for the success of the project. Developing in a consistent way across an organisation makes it easier to make changes and avoids siloing of information – something that holds back development speed across teams.

4.3 Inter-disciplinary Skills

Another important aspect is having team members who can operate outside their normal area of knowledge. Utilising the "You build it, you run it" philosophy will develop skills in operations and give a better feeling of ownership of the product compared to having dedicated operations engineers who abstract the developer from the end result.

Building this mindset will empower your team members to work on any aspect of the product which improves motivation and productivity. If you followed the previous step of creating an open and collaborative environment this will happen naturally in your organisation.

4.4 Learn Together

Having the whole team learn together is another way to build up a successful DevOps culture. There is no point going out of your way to learn a better way of doing something for your team if no one else understands and it ends up costing more time than without having done so. Bringing everyone up to speed on the latest tools and methods will make each member feel valued and strengthen their feeling of contribution to the success of the project.

5 Conclusion

DevOps is both a cultural perspective on development as well as some tools and processes that allow that culture to flourish. You now know how important that cultural aspect is and the benefits it lets you enjoy. You also have insight in to how the broader industry and high-profile companies uses DevOps and how there is still work to be done to improve.

While DevOps is an ever-changing idea, the concepts behind it will be ever-beneficial – especially the cultural improvements for the work environment. A developer who feels they are responsible for the end product and has the freedom and ability to do so will outperform those that do not. For further reading look in to this wonderful article by Irma Kornilova titled "DevOps is a culture, not a role!" (Irma Kornilova 2017).

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