DevOps in Finance - Pros and Cons

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Contents

1 Introduction

Around the years 2007-2008 was the first time that DevOps was really talked about in the IT industry. DevOps came into the picture when the agile methods were no longer sufficient for developing software systems in an efficient way. The major problem was that the development team and operation team were too isolated from each other. The teams had different objectives, were under different leaders and often worked on separate floors. Some issues that occurred due to the teams being isolated from each other are for example that they were only concerned about their own fiefdoms, which led to bad final releases and as a result, unsatisfied customers [1]. Instead, if the development and operation teams work together as one unit, many of these problems disappear. One indicator of the positive outcome of a DevOps oriented work environment is the fact that DevOps has increased in popularity throughout the world [2]. Different sectors and established companies, such as HP, Amazon, and Netflix, have adopted a DevOps methodology [3]. The use of DevOps comes with some benefits but of course also some difficulties. Different sectors get different benefits and have different obstacles to overcome when using DevOps. One interesting sector is the finance industry. Finances are one for the largest industries and it was estimated that the financial services market was going to reach $22.5 trillion in the year 2021, growing at about 10% from the year before. This would mean that the finance industry would comprise about 24% of the world's economy, making it one of the worlds most important industries [4]. A survey shows that 90% of the financial services firms agreed that customer experience is a critical competitive advantage in the industry [5]. Customers are also demanding more digitalization in the finance industry. Hence companies in the industry need to adapt in order to be able to thrive, if new, better, methods and techniques are discovered, they need to be fast to adopt them [5]. This is further backed by PWC who reported that the financial services are too slow to transform from traditional operations. Another report says that new customers in the industry are choosing digital services over traditional banks, where they appreciate the faster and easier access to their financial information [6].This is a problem for the established traditional major banks, slow transformation lead to slower and more complex ways for customers to manage their finance which in turn lead to losing customers to more modern solutions. One solution for this problem, which is going to be explored in this essay, is that traditional banks and other

financial companies turn to DevOps. DevOps has a lot of benefits and could be a great method to use when striving to be one of the most competitive companies in the market. Hence, this essay will go through how DevOps and the finance industry can be integrated with each other. Advantages, disadvantages and obstacles for using DevOps in the finance industry will be presented. Lastly, a reflection and conclusion about the subject will end the essay.

2 Advantages

One of the main concepts of DevOps is to remove the division between different groups within an organization, primarily between development and operations. However, the method to achieve this can be adapted to many different kinds of groups within an organization which makes the DevOps concepts very versatile to fit the needs of the organization. This is why many different sub-branches of DevOps have surfaced, such as SecOps, DevSecOps or MLOps. This means DevOps has advantages for almost any organization that wants to increase their planned work through development, while they at the same time want to maintain the reliability, quality and security for their customers. Some competitive advantages that DevOps enables are faster time-to-marketing, improved productivity and increased customer experience which are especially important in the finance industry. DevOps helps reduce the time between when a change is committed and when the change has been implemented in the final product, while at the same time ensuring high quality in the product/system [7].

2.1 Quick Realization

Quick realization of software projects are of great importance and can save both money and time. The finance industry has frequent changes and new technologies are often released. The importance of knowing what to develop and what to release are key features in the industry. It is often the operation team (Ops) that accepts or denies a new release depending on their risk assessment. Thus, it is the Ops that has the responsibility of the quality and they have a lot of impact on the time it takes to release the new feature. If the development team and the operational team works together as DevOps instead of them working isolated, the time it takes from development to risk assessment and then possibly release of a feature decreases [7].

2.2 Security

Security and safety are of great importance in the finance industry, and they have been one of the major setbacks in replacing legacy practices of software delivery and development. At the beginning of DevOps, the methodology was seen as an increased risk to security as it allowed for faster software releases. The increased efficiency surrounding software releases was believed to have been achieved through disregarding or sloppy regulatory controls and risk assessments. Some companies in the finance industry that use DevOps have shown that the DevOps methodology has consistently reduced potential security problems, it has helped to tackle threats faster and it has helped to locate issues. As a result, the earlier stated misunderstanding of how DevOps compromised security was dismissed and many companies have adopted the automation practices that enforce security and safety through for example, audit requirements and repeatable processes that require minimal human interaction. The latter also addressed many challenges that arose within distributed companies [8].

2.3 Architecture and test-automation

Although digitalization is a common topic and is adopted by many companies, digitalization is often only implemented in a way that does not affect the architecture. It is somewhat limited to translating physical resources into digital ones. Thus some companies in the finance industry remain with chunky, old-school, and time-consuming architectural processes. To stay competitive in the market they need to modify their architecture to be able to adapt and make changes faster. DevOps methodology addresses this by remodeling the entire workflow/architecture in a company into something that is more dependable and adaptable. With DevOps the companies will most likely change their architecture to a microservices architecture. Some benefits that come with microservices architecture is that it helps to simplify the complexity and numerous integrations that exist and thus makes it more scalable, agile, and manageable [5].

The finance industry and all its services need to have high quality due to customer experience being one of the most important factors. This means that there is no room for error or mishaps in the offered services. When working to solve bugs or make new features in a system there are often unforeseen consequences that is only caught by testing. Therefore continuous testing is a great

method to use in the industry to reduce the risk of releasing faulty software. Furthermore, automating continuous testing is something that goes hand-in-hand with DevOps. Combining continuous testing with automation, does not only ensures high quality in end products but it also speeds up the developing pipeline [5].

3 Disadvantages

There are few methods that are without fault, and DevOps is no exception. While DevOps may present many advantages, these quickly fade when a DevOps environment is poorly implemented. A poorly implemented DevOps approach could be worse than not using DevOps at all as it brings with it the difficulties of restructuring a company, without the benefits of DevOps. Restructuring an organization to adopt a DevOps environment is no small task. Therefore it is important to understand and consider what the process entails, whether it be costs for new tools or simply if the organization is in a state which can handle such a transformation. Many roles will be redefined and previous work assignments may change, therefore it's important to have a good way of communicating to the entire organization to tackle any obstacles that the transition may present [9].

3.1 Obstacles to overcome

3.1.1 Culture

One of the largest obstacles to overcome when using DevOps in the finance industry is the cultural change in the company. Traditional banks have historically had their operation teams and development teams separated with almost no communication between management. The culture of no communication and the team working separately is something that needs to change and could take time. There are several cultural challenges that could make it hard to implement DevOps. For example:

- Barriers or power struggles between teams
- Old-school hierarchy throughout the organization
- Bad and ineffective lines of communication
- Dysfunctional leadership

- The company works as silos, separated throughout the organization
- Company is resistant to change
- Company has not the culture "learn from failure"

Trying to implement DevOps when a company has those points will lead to failure and thus a cultural change needs to be done before or in parallel when implementing DevOps [7].

Interesting enough is that the development team often sees positively on DevOps due to a lot of advantages regarding creative thinking and innovation. Contrary to the development team, the operational team is not as positive to DevOps. This is because the operational team are working against bugs and unsafe code. With regularly new code to the product/service there are a lot of things that might go wrong, thus the operational team might get a large workload and therefore the proposal of DevOps might not be popular. A solution to this is that small bits of code should be released continuously instead of releasing much code fewer times, thus making the production cycles smaller. There needs to be a change in mentality throughout the workers, they need to see the benefits of DevOps and be somewhat more open minded to the proposal of DevOps [10].

3.1.2 Complexity

Another potential obstacle that may arise is the complexity of the infrastructure. The finance industry and its services were not built for rapid and iterative changes, they were meant for stability and safety. The financial systems are one of the most complex systems that exist throughout the world. Systems often rely and overlap on other systems, where simultaneously there exist multiple files of data that need to be in sync with the systems. The systems often interconnect across the whole industry which makes the situation even worse. Changes in the systems become riskier and harder due to the complexity and that it can affect a bunch of other systems and companies. Changes in the systems happen often but it is not regular to test all "system of systems" when doing a change. This results in that bugs, errors and other failures can appear later in the "system of systems" and thus making other companies or protocols to work incorrectly [11].

4 Conclusion

There are many ways in which the finance industry can benefit from implementing DevOps. These include, but are not limited to, reducing the time it takes for an idea to become a product, automatising the safety and reliability checks for said product, and finally migrates many services into automated digital tools, effectively reducing the company's dependency on human interaction. However, DevOps is not a magical solution that should be implemented without consideration. The implementation process could be a substantial and costly change in larger, established, companies. Thus adopting DevOps and making said change should not be attempted without proper preparation. A poor implementation could, and most likely will, result in more setbacks than benefits. Finally, given the success in other industries, and the diversity of DevOps, we fail to see why DevOps should not be used within finance, assuming it's implemented correctly.

5 Reflection

The future of DevOps is bright and we predict that the methodology will continue to grow throughout all sectors and the whole world. The advantages that DevOps can bring to an industry, a company and the society as a whole, is great, and it could be seen as naive not to use it. DevOps is not and will not be useful for all products, services and even some industries. But according to us, to stay competitive in a fast moving market and to embrace innovation, adaptability and change, the DevOps methodology is of great use in the finance industry. A correctly implemented DevOps approach provides benefits to security, product reliability, and decreases time from concept to release for products. As such DevOps can be a powerful addition to any company within finance.

The whole finance industry might not benefit from using DevOps. The complexity that exists in today's systems across the industry is something that makes DevOps difficult and can make the use of DevOps poor. Finance companies are often comfortable in older established ways. Therefore implementing a change at a larger scale could result in more drawbacks than benefits. In order to see a successful transition to DevOps, a company has to be prepared and willing to change at every level in a management hierarchy.

We believe that future financial systems and companies will embrace DevOps. For example, one case where we believe DevOps will thrive in finance, is

blockchain technology, crypto currencies and all that web 3.0 brings forward in regards to finance. Furthermore, we believe that traditional banks and systems that have not started to use DevOps will have to adopt a way to adapt and keep up with the current technological advancements if they want to survive. They will encounter more challenges than new companies but we believe that the final benefits of using DevOps far outweigh any initial setbacks.

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