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A Review Paper on: Benefits and Challenges of DevOps Developer and Modern Era

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Abstract

DevOps is the well-known modern methodology that most organizations used to optimize their business for better production and updated software. Nowadays, DevOps get popular due to many benefits such as Faster Deployment, Enhance the Entire Business, Optimizing the Software Quality, Stable Work Environment. Increase in Automation Efficiency, Improvement in Product Quality, Speed and Stability with Continuous Software Delivery, Less Cost of Production, Quick & Reliable Problem-Solving Strategies, and Teams Unity for Faster Production. To provide these benefits, the DevOps cycle plays an important role.

On the Other hand, DevOps Implementation and adoption also come across some challenges. So, the association that wanted to adopt this methodology in their companies have to tackle these

challenges. Common challenges that we studied during the review articles are Toolset Clash among Dev & Ops, Difference between the Dev and Ops Mentality, Moving from Infrastructure to Microservices, High Focus on Tools, Opposition to Change.

INDEX TERMS DevOps, Modern Era, Benefits, Challenges, DevOps Developer, Modernization, Tools, Development, Operations, Methodologies, techniques, DevOps Cycle

1. INTRODUCTION

In this modern era, as we know, the popularity of technology is rapidly increasing day by day. So, organizations are always ready to look forward to new methodologies and ways to enhance their earnings and make their software better. As undoubtedly, every company utilizes various software in running business operations [1]. Therefore, the term DevOps Developer came into view. Significantly, the term “DevOps” is a mixture of two words, ‘development’ (dev) and ‘operations’ (ops). “DevOps” is an administrative procedure that promotes faster development of applications and effortless maintenance of ongoing deployments.

It is the combination of techniques and tools or cultural philosophies that are classified to increase an organization’s capacity to provide applications and services quicker than established software development methods. It's like a team of developers that work for the company's benefit to solve various challenges by improving products at a faster pace and infrastructure of administration method. Besides, speed helps associations to serve better their clients and compete more efficiently in the market [2]. DevOps promotes shorter, more controllable repetition with the adoption of best procedures by allowing organizations to build stronger bonds between Dev (developers), Ops (operations) and further stakeholders in the company for automation and new tools.

After the DevOps methodology came into view, the Agile and WaterFall methods were wiped out that were raised before for developing software or products. The main difference between agile and waterfall methods is that “Waterfall” is a linear process of working that needs the group to meet each project stage before proceeding on to the next one. On the other hand, “Agile” boosts the team to work simultaneously on distinct areas of the project. However, both Agile and WaterFall methods became part of the past after the advancement of the DevOps methodology to complete the need for development and betterment [3]. Moreover, the DevOps expression seeks

to minimize the ‘system development life cycle’ and bestows the continuous delivery and high quality of software. At the same time extending the reliability, stability, safety, and flexibility of the creative environment [4].

2. IMPORTANT OF DevOps DEVELOPERS IN MODERN ERA

As we discussed above in the introduction of this review article, DevOps signifies the two teams work jointly to increase the reliability of operations and the productivity of developers. Also, it is important for the development of the new products or to maintain the existing deployments in companies. Plus, the rate of adoption and importance of DevOps is significantly increasing from 2015 to 2016, according to DevOps.com [5]. Therefore, in this modern era, the demand for the DevOps methodology is high than others, such as Agile or Waterfall. Because every company wants to improve their software and products with high quality.

2.1 Who is Taking Advantage of DevOps in Modern Era?

Over the last decades, DevOps is responsible for transforming business standards and also raising competition leading to a sky-rock interest. No doubt, in the modern era, the demand for DevOps engineers or developers is high; however, not every company can afford this kind of methodology.

Initially, DevOps was used by huge organizations [6] that are still successfully using this method, such as Google, Amazon, Netflix, Etsy, Target, NASA, and Hertz. Undoubtedly, these organizations have caught conquest in their DevOps transformations. Nowadays, the use of DevOps can be detected in three basic [7] groups of adopters that are all tested by the fast-expanding speed of service discharges.

1. One those who are early experts of light-footed programming modification methods and are trying to the organization to International Journal of Computer Applications (0975 – 8887) Volume 180 – No.48, June 2018 17 coordinates the rapid speed of programming innovation. The run of the mill discharge speed in these companies varies from month to month instead of every day. An unremarkable purpose of premature professionals is to wipe out modification work-in-advance adjournment forced with the help of testing and operational discharge.

2. Second, are the Web-scale specialists, which acquire DevOps to achieve multiple mini-scale discharges for an application in a day. They work on the Motto, "Analyze and move forward."
3. While on the third, we get the Traditional IT companies operating in fixed and regularly required to businesses. For example, back have managed discharge hones.

Consequently, above three gatherings share a few goals that are following:

- I. Disposing of the time and asset limitations of utilization conveyance.
- II. Ensuring the quality, soundness, and constant change of their discharges and the knowledge for their end clients.
- III. Make the essential contrasts between the gatherings in light of the business and nature of the administration that is driven by the repetition and size of use discharges.

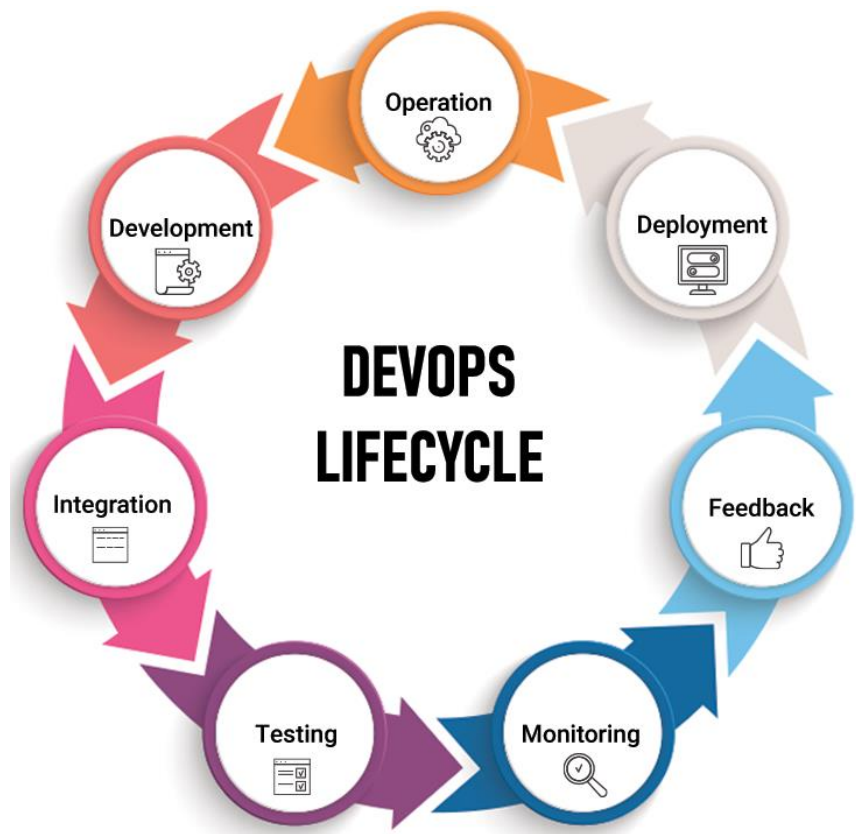
3. WHAT IS THE DevOps CYCLE?

When we talk about the “DevOps”, its Cycle is most important that is based on different stages. Generally, these stages involved in the DevOps methods show users from development to deployment and monitoring. It delivers a standardized system to combine DevOps techniques into your delivery pipeline to improve the speed and dependability of the delivery procedure.

3.1 Stages of DevOps Cycle

Mainly, the DevOps cycle has seven stages that are following:

1. Development
2. Integration
3. Testing
4. Monitoring
5. Feedback
6. Deployment
7. Operations



To better understand the DevOps life cycle, here we discuss each phrase precisely that helps you to know how this cycle works.

1. **Development:** Significantly, in the DevOps Cycle, the first phase or the step is ‘Development’, which is based on the coding and planning of the software. Basically, this step divides into two parts: planning and coding. In the first part of planning, the vision of the project is decided, for which you do not need a specific tool. On the other hand, the

second part is coding, for which different kinds of tools are required to maintain the code after or during the development. Moreover, this maintenance procedure of code is known as “Source Code Management.” Whilst Git, VN, Mercurial, CVS, and JIRA tools are popular that are used in this phase.

2. **Integration:** The Second Phase of the DevOps Cycle is 'Integration', which is known as the heart of this cycle due to its software development practices. In this phase, experts need to change the source code more frequently on daily or maybe weekly terms. Plus, building new code, also includes code review, testing and continuous integration. Hence, the updated code requires to be integrated continuously and smoothly with the systems to mirror changes to the end-users because of the continuous development of software.
3. **Testing:** In this stage of testing, already developed software's tested continuously to detect any kind of bugs. In this process of continuous testing, various automation testing tools such as Selenium, TestNG, JUnit, etc., are used. These tools ensure that the functionality of the software must be flawless and bug-free.
4. **Monitoring:** As its name shows, 'Monitoring' is the process in which the performance of software and applications is continuously monitored. All the crucial information about the use of the application is recorded in this monitoring phase which helps you to know the right functionality of the software. Moreover, in this phase, the root cause of any problem is detected and maintained the security. Besides, this step makes sure the availability of services, resolved the network problems or automatically fixes the issues as quickly as they are detected.
5. **Feedback:** In the DevOps cycle, 'Feedback' is also a vital phase in which developers and all the experts give their feedback about the uses of software and the applications. With the help of this step, experts can better understand the flaws in coding and improve software and applications. Overall, Feedback is important to keep better updates in future for products and applications.
6. **Deployment:** In this process cycle, the sixth phase depends on 'Deployment', where the code is deployed to the production servers. The important thing in this process is that the code should be correctly deployed on all the servers. Meanwhile, continuous deployment

lessens the risk of the specific deployment failures or if any case of failure, you can quickly go to the back of the previous version.

7. **Operations:** The last step of this DevOps cycle is 'Operations', which depends on the harmonization with the entire robotization of the delivery cycle and enables the association to fasten the general possibility to promote repeatedly. Mainly, the operations highly depend on monitoring to understand the health of the application and ensure that functions of applications are reliable throughout the process of operations. The duty of keeping the application is specially related to the operations team. Nevertheless, it can extend across to other teams in an issue such as a bug needing numerous workers to develop, test, and deploy the fix.

In short, the DevOps life cycle is a complete process of seven phases in which various tasks performs by the team of developers and experts accurately. With the help of this cycle, the organizations are able to check the continuous assessment of applications and software, detect and remove bugs, improve the flaws and do frequent updates to the latest versions. Consequently, you get the outcomes of high speed, the velocity of delivery, and improvement in stability and quality. Plus, the capacity for efficient work will be increased.

3.2 CAMS: The Core Values of DevOps Cycle

Apparently, this cycle of DevOps relies on the four core values that are Culture, Automation, Measurement, and Sharing [8]. Therefore, it is called “CAMS.” So, in this era of digitalization, the DevOps cycle for the betterment of IT development depends on the CAMS values [9].

Culture: Generally, the purpose of the culture in the DevOps cycle is to create a bond between team or groups that belongs to various cultures. It helps to create unity among them so they can do their work as a single entity.

Automation: During the DevOps phases, automation is also an important factor because it helps to improve the productivity and the workflow of the organizations. Besides, it eliminates various human errors and is able to fix them without any delay.

Measurement: The core value of the measurement is also vital because it monitors or tracks the progress of numerous activities that are performed during the DevOps Cycle, such as it measures multiple metrics to increase performance and productivity.

Sharing: Mainly, the success behind the team of DevOps is sharing the tools, knowledge, experience and discoveries among the team members. Consequently, in this DevOps cycle, sharing has many benefits.

4. BENEFITS OF DevOps DEVELOPER IN MODERN ERA

Undoubtedly, in this era of digitalization, the DevOps approach is the best to enhance the production quality, advancement in software and workflow of the organizations by getting the help of IT developers. Therefore, in the modern era, the concept of DevOps methodology gets popularity in a blink of an eye. Like all other things, the review also found that DevOps has numerous benefits that are why the world's top associations, such as Amazon, Google, Netflix etc., adopt this method [10] [11].

There are primary benefits that you get in this modernization because of DevOps techniques which allow you to move ahead in the competitive market and become more systematic.

1. Enhance the Entire Business

The first biggest benefit of the DevOps methodology is to help you to enhance your whole business. System architect Patrick Debois, who is well known as the creator of the DevOps movement, says the great benefit of DevOps is the understanding it provides, which forces associations to "optimize for the whole system," to improve the business as a whole [12].

2. Optimize the Software Quality

Significantly, the DevOps techniques help you to optimize your software quality and remove the flaws [13]. No doubt, the team of DevOps developer work together to improve the application and software quality to boost the business and the productivity of the organization so it can work quickly.

3. Stable Work Environment

When you want success, the environment of the organization is the most important thing. So, the DevOps practices provide you with the benefit of stabilizing the work environment with a well-balanced strategy for operations [14].

4. Increase in Automation Efficiency

According to Robert Stroud, “DevOps is all about the fueling the business transformation” that depends on the phase of people, process and a culture change [15]. Therefore, with operating engineering functions end to end, DevOps underlines deploying software more often, reliably and securely via automation.

5. Improvement in Product Quality

Another benefit that you come across while using the DevOps strategy is the betterment of product quality. Mainly, in DevOps, the team of developers work together to make the production of the organization better than before.

6. Speed and Stability with Continuous Software Delivery

DevOps method in modernization allows associations to meet the fast speed of the technology. It also helps to stabilize the software. Besides, the experts’ team in DevOps make sure the continuous updates of the software improve its speed and working. In short, DevOps ensure both speed and stability with continuous software delivery [16].

7. Less Cost of Production

While using the DevOps methods, you also get the benefit of minimum cost of production. In DevOps, complete teamwork helps to cut down all the production and management costs because both maintenance and new updates are brought beneath a single roof.

8. Quick & Reliable Problem-Solving Strategies

One of the primary benefits of DevOps is the quick and reliable problem-solving methods that help you to remove all the errors and bugs instantly. Plus, the team of DevOps can solve all the technical errors in software management. So, the work will be done without any fear and with full confidence that errors will be detected immediately [17].

9. Teams Unity for Faster Production

Undoubtedly, the unity among the teams is very important in any organization for better and faster production, and only DevOps provides you with this facility in which teams work with complete collaboration and trust.

10. Faster Deployment

One of the best benefits of DevOps for both customers and organizations is the faster deployment [18]. Indeed, faster and frequent delivery of updates and features satisfies the customers as well as improves the standard of your company in the market.

4. MODERN ERA CHALLENGES OF DevOps

In the modern era, where you get numerous benefits from DevOps, its implementation and adoption face several challenges as well [19]. Therefore, during the review article, we highlighted a few challenges that probably associations faced. Generally, the primary challenges in DevOps found in this digitalization era are five that are given below [20]:

1. Toolset Clash among Dev & Ops

One of the challenges that face DevOps is the toolset clash, between Dev and Ops tools because both have entirely different toolsets and metrics. Therefore, DevOps teams have a problem while using the tool for development and operations.

2. Difference between the Dev and Ops Mentality

Another challenge of DevOps in this modern era is the mentality difference between dev and ops. To get overcome this problem is a great challenge for organizations; however, to understand the importance of the DevOps mindset, the design of a social-technical system is required [21].

3. Moving from Infrastructure to Microservices

Because of advancement, the older infrastructure and applications could be problematic. Therefore, it is a challenge for DevOps to move from code to microservices, and it takes time to implement.

4. High Focus on Tools

Another Challenge for DevOps is the high focus on tools. DevOps depends on a combination of tools to make an SD pipeline. So, the integration of those tools can establish complex and difficult maintenance problems.

5. Opposition to Change

For most people, change is scary. Hence, DevOps face the challenges of revolution in current development that can help to solve problems.

6. Conclusion

In the end, we concluded that in the modern era, DevOps has many benefits with a complete cycle of work. Moreover, it faces challenges as well that varied according to the different situations like challenges to implementation, adoption or scaling. However, the primary challenges that DevOps face nowadays are five that are important in all aspects of implementation and adoption.

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