DevOps : A Review

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ABSTRACT

DevOps is developer plus operation is basically a software development strategy which bridges the gap between the deaf side and offside of the company. So DevOps is basically term a group of concepts that while not all new half catalyse into movement and a rapidly spreading well the technical community like any new and popular term people may have confused and sometime contradictory impression of what it is. DevOps is not technology. It is the methodology so basically DevOps is a practice that equated to the study of building evolving and operating rapidly changing system at scale. So DevOps is the practice of operation and development engineering participating in the together in the entire software life cycle from design through the development process to production support and you can also say that DevOps is also characterized by operations staff making use many of the same technique as Developer for this system work. It is the latest methodology in the IT industry and it will remain that way until every organization out there achieve. DevOps is used in most software industry for create the most complex project in minimum time to continuously working in that stages. Before Devops used waterfall model and agile model in software industry but in this methodology there are lot limitation so that overcome this limitation by the devops. In this methodology there are many stages and in this stages all work is continuously integration and continuous deployment that is all the work infinite in loop DevOps give the good quality software and fast delivery to the market all this hope complete by the DevOps. It is work like finite loop.

Keywords : DevOps, agile, waterfall, fast delivery.

I. INTRODUCTION

In recent years, the cost of releasing software has decreased dramatically due to the shift from shrink-wrapped software to software [1]. Industry that can release software early and with a high frequency have a higher capability to compete in the industry [2]. A new approach called DevOps to satisfied these all goal related to software industry. It has been defined as an organization approach aim creating empathy and cross-function and collaboration. It has also been called a "stub for more global company association. The ambition of DevOps has been defined as that of reducing the time between development and operation of software without negatively affecting quality[3].IBM has coined the term Collaborative DevOps as "designing processes for coordinating software development teams.

How is this definition relevant because all we are saying here is Devops is characterized by operation staff making use many of the same technique as developer for their system work seven[4]. I will explain you infrastructure as code you will understand why I am using this particular definition so as you know that Devops is software development strategy which bridges the between the dev part in the upside

of the company and deliver good quality software in the time and how this happen this happens because of various stages and tools involved in DevOps[5].

So in this methodology there are various stages are available and each in particular stages there are various different tools are available in this methodology. These tools are easy to make the process for complex project. In software industry there are 10 top tools are used to easy implementation for particular software. DevOps is a developer and operations are both team work together and provide the better software quality product for market. It is a continuous process and continuous development, testing, integration, deployment and monitoring For live example is Netflix, Amazon, facebook , instagram all this application are continuous working that is continuous development and continuous testing and releasing the new feature continuously[6].
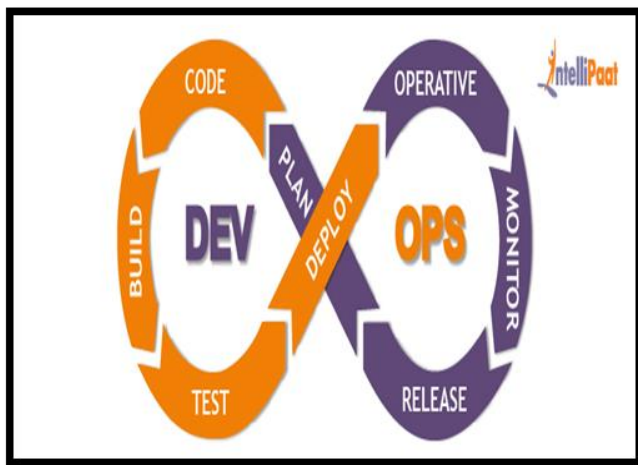

Fig.1: Symbol of DevOps

II. METHOD AND MATERIAL

A. Literature Review:

1) WATERFALL MODEL:

In recent year 1990 in software company used the waterfall model. The waterfall model is also a methodology used in industry before discovered the

DevOps and this waterfall model is sequence of model. In this model there are backtracking are not possible. In waterfall model their six stages are involved analysis, Design, Implement, Test, Deploy, maintained suppose developer in maintained stages and developer want some bugs is occur in design stages so that developer may not come in pervious way so that backtracking is not possible at that time so that it is big limitation in complex project because some complex project in many source code are available so that which line indicate the error in source code this facility are not available in waterfall model. In waterfall model high amount of risk are occur[7].

First one is once the application is in the testing stage it is very difficult to go back and change something that was not well thought out in the concept stage now what mean that suppose you have written the code for the entire application but in testing there's some bug in that particular application now in order to remove that bug you need to go through the entire source code of the application which used to take a lot of a time that is a very big limitation of waterfall model apart from that no working software is produced until late during the life cycle.[8] we saw that when we are discussing about various stages of what for more there are high amount of risk and uncertainty means that once your product is live it is there in the market then if there is any bug or any downtime, then you have to go through the entire source code of an application again you have go through the entire process of waterfall model just saw in the order a working a software again in this a lot of time and lot of risk and lot of uncertainty.

2) AGILE MODEL:

Agile methodology is a practice that support continuous repetition of development and testing throughout the software development life cycle of the project. So that development and testing of an application used happen continuously with the agile

methodology. So focus on diagram so here we get the feedback from the testing that we have done in the previous iteration. We design the application again then we develop it there again we test it then we discover few things that we can incorporate in the application. We again design it develop it and there are multiple iteration involved development and testing[9].

Each project is broken up into several iteration and all iteration should be of the same time duration and generally it is between 2 to 8 weeks and at the end of each iteration of working should be delivered so this is what agile methodology in nutshell.

The first and biggest limitation of agile methodology is that the dev part of a team was pretty agile the development and testing used to happen continuously[10]. But when deployment then that was not continuous there were still a lot of conflicts happening between the dev the off side of the company the dev team want agility. Whereas the ops team want stability and there's a very common conflict that happens,
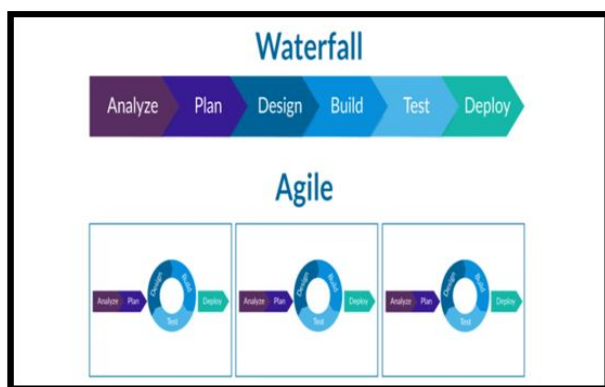

Fig.2 : Waterfall model Vs Agile model

So that all this limitation are overcome the DevOps. The idea start in 2008 with a discussion between" Patrick Debois" and "Andrew Clay "Sharinger concerning the concept of DevOps infrastructure and day by day to improve the performance of DevOps following:

- In 2009, the first conference named DevOps this conference was held in Ghent, Belgium. The conference was founded by Belgian consultant, project manager and agile practitioner Patrick Debois.[11] The conference is define the definition and some concept to the devops.[12]
- In 2012, the State of DevOps report was launched by "Alanna Brown".[13] As of 2014, the annual State of DevOps report is published by"Nicole Forsgren".
- Gene Kim," Jez Humble" and others.[14] In 2014, they found that DevOps adoption was accelerating.[3] Also in 2014, Lisa Crispin and Janet Gregory write the book More Agile Testing, containing a chapter on testing and DevOps.[2][1]
- In 2015," Nicole Forsgren"," Jez Humble" and "Gene Kim" found DevOps Research and Assessment.[15]
- In 2017, "Nicole Forsgren", "Jez Humble" and" Gene Kim" published "Accelerate Buildingand Scaling High Perfoming Technology Organizations".

Sharing tells the father of DevOps," Patrick Debois". The final keynote of JAX London was delivered by the Father of DevOps, Patrick Debois outlining the importance of Sharing within the DevOps culture.

B. Architecture and working:

What is DevOps the term Devops is a combination of two words namely development and operations DevOps is a practice which allows a single team to manage the entire application development life cycle that is development testing deployment and operations DevOps is a software development approach through which superior quality software can be developed quickly and with more reliability DevOps consists of various stages such as continuous

development containers testing continuous integration continuous deployment and continuous monitoring the aim of DevOps is to shorten the systems development lifecycle while delivering features fixes and updates frequently in close alignment with the business objectives[1]as you can see in this diagram
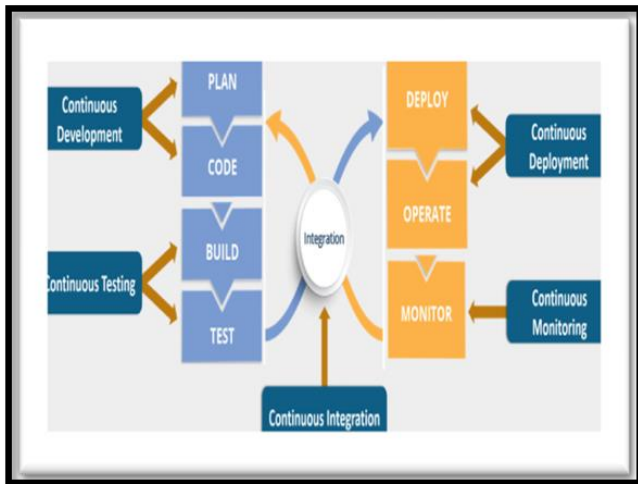

Fig.3: DevOps lifecycle

A. Continuous Development:

The first phase of the DevOps life cycle is continuous development this is the phase which involves planning and coding of the software applications functionality there are no tools for planning as such but there are a number of tools for maintaining the code the vision of the project is decided during the planning phase and then the actual coding of the application begins the core can be written in any language but it is maintained using the version control tools these are the continuous development DevOps tools the most popular tools used are get SVN mercurial CVS and JIRA also tools such as ant maven and Graded can be used for building or packaging the code into an executable file so that it can be forwarded to the next phases so guys tools like git enable communication between the development and the operations team and this was one of the drawbacks of the previous model that is the agile model so now let us have a look at the version control tool called git, Git is a distributed version control tool that supports distributed nonlinear workflows by providing data assurance for developing quality software when you are developing a large project with a huge number of collaboration.

B. Continuous testing:

The next phase of the DevOps lifecycle is continuous testing this is the stage where the developed software is continuously tested for bugs for continuous testing automation testing tools such as selenium tests ng J unit etc are used these tools allow the Q is to test the multiple code bases thoroughly in parallel to ensure that there are no flaws in the functionality in this phase you can make use of docker containers for simulating test selenium does the automation testing and the reports are generated by testing Z but to automate this entire testing phase you need a trigger and that trigger is provided by the continuous integration tool such as Jenkins automation testing saves a lot of time effort and labour for executing the test cases besides that report generation is a big plus the task of evaluating which test cases failed in the test suit gets simpler these tests can also be sure dual for execution at predefined times once the code is tested it is continuously integrated with the existing code so this was all about continuous testing.

C. Continuous Integration:

Next stage of the DevOps life cycle is continuous integration this is the stage where the code supporting new functionality is integrated with the existing code since there is continuous development of the software the updated code needs to be integrated continuously as well as smoothly with the system's to reflect the changes to the end-users the changed code should also ensure that there are no errors during the runtime which allows us to test the changes and check how it reacts with other changes so there's one very popular tool that is used in this phase which is known as Jenkins using Jenkins one can pull the latest code revision from the git repository and produce a built which can be finally deployed to the test servers or

the production servers so let me put this in simpler words guys imagine if a developer commits any change onto the code which is available on the git repository as soon as there is change in this code on the git repository Jenkins will fetch that code and it will produce a build this build is nothing but an executable file which is in the form of a jar file or a war foil and this build can be forwarded to the next stages that is either the production servers or the test servers so this was all about continuous integration.

D. Continuous Deployment:

The next phase of the DevOps life cycle is continuous deployment it is the stage where the code is deployed to the production environment here we ensure that the code is correctly deployed on all the servers now it is the time to understand why DevOps will be incomplete without configuration management tools and containerization tools both the set of tools help us in achieving continuous deployment configuration management is the act of establishing and maintaining consistency in an applications functional requirements and performance so let me put this in simpler words it is the act of releasing deployments to servers scheduling updates on all the servers and most importantly keeping the configurations consistent across all the servers since the new code is deployed on a continuous basis configuration management tools play an important role for executing tasks quickly and frequently some popular tools that are used in this stage are puppet chef salt stack and anile containerization tools also play an equally important role in the deployment stage docker and vagrant are the popular tools which help produce consistency across the development test staging and the production environments besides this they also help in scaling up and scaling down of instances easily it eliminates any chance of errors or failures in the production environment by packaging and replicating the same dependencies and packages used in the development testing and the staging environment so this was all about the continuous deployment.

E. Continuous Monitoring:

The final phase of the DevOps lifecycle is continuous monitoring this is a very crucial stage in the divorce lifecycle which is aimed at improving the quality of the software by monitoring its performance this practice involves the participation of the operations team who will monitor the user activity for any bugs or improper behaviour of the system this can also be achieved by making use of dedicated monitoring tools which will continuously monitor the application performance and highlight the issues some popular tools used are plank ELT stack Nagios New Relic and so on these tools help you monitor the application and the server's closely to check the health of the system proactively they can also improve the productivity and increase the reliability of found could be reported to the development team so that it can be fixed in the continence development phase these DevOps stages are carried out on loop continuously until the desired product quality is achieved show the following diagram in different tools are used in different stages this tools make a easy work:
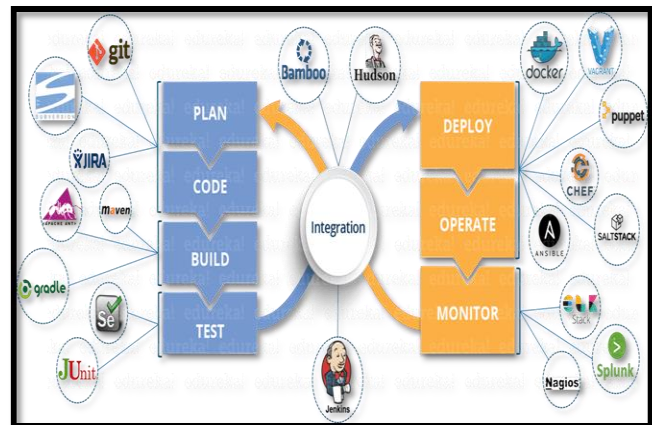

Fig.4: Various tools are used in various stages

III. ADVANTAGES

- Continuous software delivery
- Less complexity to manage
- Faster resolution of problems
- Faster delivery of features

- More stable operating environments
- enhance communication and collaboration More time to new (rather than fix/maintain)

IV. LIMITATIONS

- Need of domain knowledge: This could be a problem if serious integration work will be involved in automation projects.
- Some security risk: The use of cloud services may cause some security risks.
- Costly: Good companies with skilled consultants would end up charging more.
- More lasting dependency than your plan. DevOps driven automation projects are normally compcostlyex.

V. CONCLUSION

In this paper, we have explained challenges encountered during the adoption of continuous practices in Software develops using DevOps. DevOps is the next big thing in software development and IT products. We Identify standard methodologies that are used before DevOps model, which helped us to know more about the DevOps. Then we explained Life cycle of DevOps. And also we mentioned the different tools that are used in different stages of life cycle. After that we focused on advantages and limitations of a DevOps methodology. At end of this paper we figure out DevOps applications. It integrates the best parts of different software development methodologies and best practices in combination with some best social psychological beliefs for motivating peoples.

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