An Empirical Study on DevOps

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Abstract - **In all areas of software process time and quality pressures are affecting so one proposed solutions to these pressures is the term DevOps. Where DevOps is aimed to increase the frequency, quality and speed for deploying software from improvement into production. DevOps is a combination of development and operation. DevOps is a software progress method that extends the agile philosophy to rapidly produce software products and services. DevOps is a practice where operations and developers work together from development phase to production phase. DevOps is a good term for developers, where developers need DevOps term for an enhanced quality time software product and for more relevant work. This paper gives the concept of DevOps.**

Keywords: DevOps, Deploying Software, Agile Philosophy, Collaboration, Automate.

I. Introduction

In year 2009, first conference named devOps days was held at Ghent, Belgium. This conference was founded by Belgian consultant, project manager and agile practitioner Patrick Debois. Now the conference has spread to other countries.

In 2012, Alanna Brown at Puppet conceived and launched the State of DevOps report. As of 2014, Nicole Forsgren, Gene Kim, Jez Humble plus others published the annual State of DevOps report.

As in 2014, they found that DevOps adoption was accelerating. Also in 2014, the book is also written named More Agile Testing, containing a chapter on testing and DevOps by Lisa Crispin and Janet Gregory.

In 2015, DORA: DevOps Research and Assessment was founded by Nicole Forsgern, Jez Humble as well as Gene Kim.

In 2017, "Accelerate: Building and Scaling High Performing Technology Organizations" is published by Nicole Forsgern, Jez Humble along with Gene Kim.

DevOps is culture which promotes collaboration between development and operation group to deploy code for faster production in an automated and repeatable way. Term DevOps is combination where in Dev means all the developers involved in production phase and Ops means term used for system engineers, system administrators, security professionals and various other job titles. DevOps is a practice in which operations and developers participate together in each stage of DevOps life cycle where from development stage to production stage. It helps to increase an organization's speed to deliver application and services. It also allows organization to serve their customers better and compete more strongly in the market. In simple words, DevOps can be termed as an alignment of development and IT operations with better communication and collaboration.
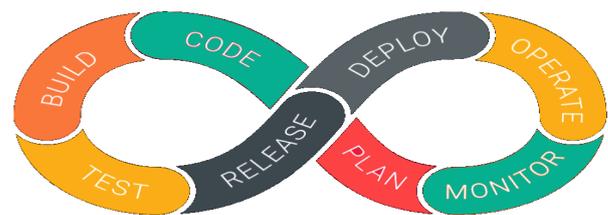
II. DevOps Life-Cycle

Figure 1: Life-Cycle of DevOps

The term DevOps is deep combination of development and operations. Understanding DevOps is not possible without knowing DevOps lifecycle. So,

2.1 Development

Here the development of software takes place constantly. At this phase the entire development process is divided into small development cycles. That benefits DevOps team to speed up software development and delivery process.

2.2 Testing

Here QA team use tools like Selenium to identify and fix bugs in the new piece of code.

2.3 Integration

In this phase the new functionality is integrated with prevailing code, and testing takes place. Continuous development is only feasible due to continuous integration and testing.

2.4 Deployment

The deployment procedure takes place continuously; it is performed in such a manner that any changes made any time in code should not affect the functioning of high traffic website.

2.5 Monitoring

Here the operation team takes care of inappropriate system behavior or else bugs which get found in production.

III. DevOps Work Flow

Figure 2: Work Flow of DevOps

It allows the ability to split jobs which is top-requested by the users. It also gives the ability to monitor their ideal process in the configuration jobs. It also provides visual overview of the sequence in which input is provided. It tells about action performed output generated for an operation process.

IV. When to Follow DevOps Concept

It should be used for the large distributed applications such as like E-Commerce sites or on the applications that are hosted on the cloud platform.

V. When to Not Follow DevOps Concept

It should not be used in mission essential equipment like bank, power and other sensitive data sites. To data centers such applications need strict access controls on environment production, detailed change in management policy and access control policy.

VI. Reasons to make use of DevOps

The term DevOps allows the agile development team to implement continuous delivery and continuous integration that

helps to launch the products faster into the market. Some other important reasons are considered as follows,

6.1 Predictability: The term DevOps offers noteworthy lower failure rate of new releases.

6.2 Reproducibility: It version everything so that the earlier version can be restored anytime.

6.3 Maintainability: Within the event new release disabling or crashing the current system, the recovery of the process is effortless.

6.4 Time route for market: Particularly in case of digital plus mobile applications through the streamlined software delivery it reduces the time to market to 50%.

6.5 Greater Quality: It helps the team to provide improved worth of application development.

6.6 Reduce Risk: It incorporates security subject in software delivery lifecycle which helps into reduction of problems across lifecycle.

6.7 Resiliency: The operational state of the software system is steadier, secure and changes are auditable.

6.8 Cost Efficiency: It offers cost efficiency in software development process which always an ambition of IT companies management.

VII. Comparison between Agile Methodology and DevOps

TABLE 1
Comparison of Agile and DevOps

Agile	DevOps
It emphasizes breaking down barriers between developer and management.	DevOps is a software deployment and operation teams.
Addresses gap between customer requirements and the development teams.	Addresses gap between the development and operation team.
Look towards more on functional and non-functional readiness.	Focuses operational and business readiness.
Agile development manages sprints. It means that the time table is much shorter where several features are to be produced and released in that period.	DevOps strives for consolidated deadliness and benchmarks with major releases, rather than less and more frequent ones.

VIII. DevOps Application Tools

DevOps being the association of development. It is obvious that a single tool cannot be adequate for all needs. So there are multiple tools necessary in each phase to perform all operations successfully. Some popular application tools used are as follows:

8.1 Git

GIT, the version control system tool that allow tracking changes in file and using it can easily coordinate the work. This has the functionality, performance, security and elasticity. It is the distributed non-linear workflow that provides data assurance for developing software quality. As DevOps term being combination of development and operation team GIT enables communication between the development and the operation team.

8.2 Jenkins

Jenkins, an open source DevOps testing tool. It can be accustomed to automate all types of tasks likely building, testing and deploying software. This tool allows developers to quickly find and solve defect in the code base to automate testing of the builds.

8.3 Selenium

It is a continuous testing tool. It is also a portable software testing skeleton for web applications. It provides an easy interface for developing automated tests. It provides a playback tool for authoring tests without the need to learn a test scripting language i.e. Selenium IDE.

8.4 Nagios

It is a continuous monitoring tool. It is also known as Nagios core which is free and open source computer software application that monitors system, network and infrastructure. It also offers monitoring and altering services for severs switches, application and services. It also alerts user when things go wrong and alerts them the second time when the problems has been resolved.

8.5 Docker

This is a containerization tool. This is also a lightweight tool which uses container to package up an application with all the requirements and dependencies before shipping complete container as one package. Containers isolated with each other and bundle application, tools, libraries and configuration files and communicate through well-defined channels.

Rather than this there are also many more DevOps software application tools that are in use.

IX. Future Scope of DevOps

The plenty of changes that are likely to take place in DevOps world are noticeable as,

- Instead of years here organizations are shifting as their needs to weeks and months.
- Than any other person in the enterprise DevOps engineers soon have more access and control of end user.
- For the IT people DevOps becoming the value skill. For example, from the survey that conducted by Linux hiring it has observed that 25% of respondent's job seeker are DevOps expertise.
- The companies need to change as they have no choice to evolve as DevOps and continuous delivery are here to stay.

X. Benefits of Using DevOps

The benefits of using DevOps are,

- Between development and operation team it builds the trust which lead to change in the attitude towards pursuing the tasks.
- The delivery of a product to the market is cost effective and speedy.
- With quick turnaround it improves value to the customer feedback.
- Due with the automation increase in efficiency, quality and reliability.
- Increment in the IT revenue.

XI. Conclusion

In conclusion, DevOps is an approach that improves collaboration among Development and Operation team. Enabling DevOps improves speed of the delivery according to the business and customer needs. Especially automation in DevOps improves the productivity, reliability and allows standardizing process, which in turn plays a major role in product escape for organization. DevOps an ever-ending process of continual improvement.

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