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A Review Paper on DevOps Methodology

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ABSTRACT

Depending and working on lean and agile practices, DevOps means end-to-end automation in software development and delivery. DevOps is the new tech-word that is creating buzz in the software field, it has different interpretation for different people. "DevOps is the software development strategy that bridges the gap between the development and operational team".

New challenge always shows up to the modern software companies that usually deal with system requirement and quality software issues. DevOps is the way to help the companies to cope with such challenges effectively. It merges the traditional software role and the work in order to enhance the communication between deployment rate and quality. The DevOps is design to introduce new set of rules, tools, and practices that offer better and more effective ways to deal with upcoming and existing challenges related to software development. DevOps is a model that combines development team and the operational team so that the deployment and quality of software maintain at agile rate.

BACKGROUND

Release of new product was infrequent and took years for deployment in the market by following the traditional approach for developing software. Every update/release can have as many of hundreds or more new features and improvements. Since the release was infrequent, the user has to wait for the longer time for the new release which creates a sense of disappointment to the user. However, it is not guaranteed that the new release line will work as thought, bugs can be found that can create another problem for the user to use the product. Which ultimately put all the companies, Under great stress and with great turmoil, an emergency release is produced and put into production (often achieved by skipping tests), which may got many bugs, and with repeated processes for quick release, which result to more frustration, stress, and disappointment. It also causes us to miss business opportunities because of lack of uncertainty in development and operational teams in IT companies.

DevOps a better way…

"CIO's who haven't transformed their teams capabilities by 2020 will be displaced."

The DevOps methodology came to existence to wipe out the difference that were arising in the agile and water fall model approach in developing the software or products.

Water fall, the Agile methodology are the thing of past now, to tackle and achieve advantage in the completion one need to develop DevOps methodology for development and delivery.

- New releases are frequent
- Bugs are fixed rapidly
- New business opportunities are sought with gusto and confidence
- New features are released, revised, and improved with rapid iterations
- Development and deployment is faster than ever.

In a study it is develop that company was able to provide a new software feature in 11 sec..

DevOps provide the strategic advantage to companies to that of traditional way of designing software development.

DevOps allow the oriented working connection among improvement and IT activities and at the same time expanding the dependability, steadiness, flexibility and security of the creative environment.

DevOps is centred to accompanying objectives:

- Develop an environment of coordination effort.
- Agile to deploy client input.
- Product can be easily changeable for different platforms by DevOps.
- Mechanize conventional operational and improvement duties.
- Use stages to accomplished situations.

DevOps Methodology

DevOps is the practice dedicated to the study of building, evolving and operating on rapidly changing system at large scale. To make it clear that DevOps is not the technology but an methodology which is build and opted by IT firms to develop the software products and deploy them at fast and accurate way. We can also define the DevOps as "practice of operation and development engineers participating together in the entire software life cycle". It is also categories by operation staff making use of many techniques of development work.

The practice of combining the philosophies and tools of software development and software operation staffs is DevOps. In 2008 Agile Toronto conference by developers and technologists Patrick Debois and Andrew Shafer were first who introduce the term DevOps.

Goal of DevOps

Guide and improve the collaboration all stakeholder with automation of the delivery process in order to:

- Improve deployment frequency
- Achieve faster time to market
- Lower failure rate of new releases
- Shorten lead time between fixes
- Improve mean time to recovery

2015 State of DevOps Report state that, the **"high-performing IT organizations deploy 30x more frequently with 200x shorter lead times; they have 60x fewer failures and recover 168x faster."**

DIGITAL TRANSFORMATION

With the motivation to capture market share and deliver value faster, DevOps promises both speed and stability to the companies. DevOps is seen as the prominent phenomenon to software delivering companies for digital transformation in sectors like banking, retail and even manufacturing. It adds up the activities of deployment and delivery to enhance the speed of updating customer's software with new feature. This also provides satisfaction to the customer and profit, which are very important aspects of companies.

Challenges

IT companies and software products may differ in maturity and its implementation, thus it creates difficulty for transforming design and deploy across teams and organization. Thus executing a successful DevOps transformation is challenge itself. To truly deliver values, there should be more that just tooling and automation in DevOps, thus simply installing a solution isn't sufficient. DevOps must include culture, process, and technology.

Companies like Kaiser Permaente, capital One, target, Starbucks and ING, indeed established the success stories that have adopted the DevOps methods, allowing them to deliver software for key application in just seconds. It enhances automation from application to infrastructure provisioning. With continuous delivery and enable fast time to market and quick software development with rapid feedback cycle can be achieve through support automation. Since this phenomenon is new in practice so reports on struggles, leadership may occur.

DEVOPS MISUNDERSTANDINGS

No exact definition exists to define the concept of DevOps to its full potential. Thus, one side focus to specifics job description for DevOps, i.e. the developer work mostly on code, operation staff work mostly with systems, and DevOps is a mix of those two skill sets. The other side argues that it is the spirit of DevOps speaks to an emerging need in the modern software development and support landscape. It had been dividing the community from some time. Employers who term themselves as DevOps are not on same page that with people who believe no such thing as DevOps. However, many jobs with seeking "DevOps engineers" proves that it is prominent job, while other

believe that the term only describe new conditions for testing, release, support and metrics gathering. The DevOps true potential can only be use when one knows about the code and platform for an app, better one will be at building and fixing that app. With the emerging software companies and support facilities came about as the need arose for better toolset to detect and measure problems in networked systems. Thus it leads software companies to make homegrown solution to common tasks and by doing so it became tedious to build, maintain and scale. To cope with this a number of products made available that address common needs such as diagnosis, deployment, automation and standardization. By doing so small or large companies could consolidate the resources dedicated to building such mechanisms. So, now development process can be figured now and can be perfectly communicates the data to heads-down developers as well as to product owners.

DevOps Core Values:

A. Culture: to upgrade interdepartmental correspondence it expel the storehouse among groups. It does so to enable all groups to impart and dispose of the impediments.

B. Automation: create consistency and empower the self-administration by sparing time and averts defects. The examples for available automation tooling:

- Build
- Release
- Deployment
- Operations

C. Measurement: deployment and conveyance is helped by DevOps. It pin choices in view for obvious and simple to peruse information are the way to having right options.

D. Sharing: DevOps realized the power of sharing International Journal of Computer Applications tools, findings, defects, and experiences enable the individual who shares similar interest.

Advantage of DevOps

It can fulfill business requirement and can remove human error from the project lifecycle if created more responsive development environment, DevOps enables organizations to:

- Reduce the implementation time of new services from months to minutes
- Increase productivity of business and IT teams
- Save costs on maintenance and upgrades, and eliminate unnecessary capital expenditure
- Standardize processes for easy replication and faster delivery
- Improve quality, reliability and reusability of all system components
- Increase the rate of success for digitalization strategies and transformation projects
- Ensure that money invested in cloud infrastructure, analytics and data management are not wasted.

Disadvantages of DevOps

- **Expertise Needed**: Outsourcing your DevOps infrastructure requires a certain level of development expertise. Understating of infrastructure and integration and how to orchestrate workflow, along with their hire experts to help match the tool processes needed.

- **Security Concerns**: Often, security isn't addressed as much as it should be when it comes to DevOps. Cloud can cause security risk that we internally wouldn't have, but with secure steps and care it can be address.

Why we need DevOps

The DevOps methodology came to existence to wipe out the difference that were arising in the agile and water fall model approach in developing the software or products.

Due to the old way which were followed to develop products have arise the tension between the developing team and the operational team. The agile methodology provides the agility to the developing while the operational team demands the stability.

Whereas, in the waterfall method the teams have to wait for the completion of the previous step, the development can't be turn back.

Draw backs of waterfall method

- Once the application is in test stage then it is difficult to roll back and make changes.
- High amount of risk and uncertainty.
- Not good for complex and object oriented projects.
- Not suitable for project where high risk of changing.

Drawbacks of agile method

- Developer wants agility and operation wants stability.

- Code may run fine on developer laptop but bug can be introduce on operation department.

DevOps Case Studies

Docusign's development has always been Agile. Thus, implementing DevOps was not a piece of cake. Since, the contract and signatures were in the nature of the business, so implementing continuous integration and delivery are undoubtedly a serious challenge. It failure or success is based on signature an approvals exchange so if any bug or error occur it will not only be vain but it would cause a serious problem. To achieve the support modern development speed, they leverage a very cool tool called an application mock — in this case, a mock for their internal API. The tools used offer a mock endpoint and deliver mock point responses. Also, they were able to combine this with incident management and before release, test the application with simulations that were close to real exchanges.

FACEBOOK

Facebook initially launched features like timeline, music, and ticker. Billions of people were on the server on the day of worldwide deployment. But due to the heavy traffic server got down. It was then Facebook launched ―THE DARK TECHNIQUE‖ which was initially based on the feature of DevOps like continuous development and continuous testing, continuous monitoring and continuous deployment. Firstly the small product is released and feedback is taken from the customer until the bug is not recovered.

Future of DevOps

- As we move to more automation there is higher chance of automating problems too. So DevOps shall ensure the security of the product being developed in production and in testing environment.
- If AI and MI is applied to DevOps pipelines it can help us to build and automat in much better and closer insights a controls.
- Since, everything is on internet thus automation of companies need to done thus it have a wide market for companies automation done through DevOps.
- DevOps methodology can be used in the new emerging, Container Technology.
- DevOps can provide a lot of applications Platform as a Service namely configuration management, continuous security and containerization.
- Its plays a significant role in the integration of all services that are hosted on different platforms.
- Whether it a developer job or operational job both are tedious process, so DevOps can act as a coding automation instrumentation i.e. the infrastructure as a code methodology and CD/CI pipelines will help to reduce the time gap.

Conclusion

No doubt, the DevOps methodology will boom your production if applied correctly, it is certainly a no match way of carrying out application development. It improves the business performance of application and allows the end user to directly contribute to the application development process. It eliminates all most all conflicts that the development and operation staff used to have while developing the project. DevOps is all about providing a path for faster time to market of new software features and achieving better stability. Right now, there is no chance it is going to be replace rather we will witness it to be a top option for developing dynamic applications that constantly evolve to meet new challenges. Here I have briefly summarize that what is DevOps methodology and how and why is has over throw the previous methodologies.

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