IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 2, February 2021

DOI 10.17148/IJARCCE.2021.10222

AN EXPLORATORY & QUALITATIVE STUDY OF DEVOPS USAGE IN PRACTICE

Mukul Kumar[1], Rahul Arya[2], Ehsanullah Nayeemuddin[3] Prof. Renu Chaudhary[4]

IT Department, HMR Institute of Technology and Management/Guru Gobind Singh Indraprastha University[1,2,3,4]

Abstract: DevOps is a collaboration of development and operations devised to stress on communication and integration between them. The main of DevOps is to help an organization to grow and excel. With its help an organization can produce software products and services. Continuous development and innovation is required in an organization and DevOps training has been started in the orientation itself. Many researchers have been written about it since 2009 and various blogs are available on the internet. Organizations have associated themselves with DevOps for a lean startup methodology. DevOps aims to aid software application by standardizing development environments.

The main use of DevOps is to streamline the day to day activities of an organization and speed up the process for timely deliveries. Companies are focusing on the automation of processes this way timely delivery and quality results are achieved. Getting the workforce trained with the latest technologies and getting optimum work for them have become the need of the hour. Problems can be more easily solved by this software development method. Documented processes could be devised by it and processes could be made user friendly. Developers are trained and given environmental control and application centric knowledge to sustain. Simple processes are modified to result in optimum development and growth.

Keywords: Docker, Container, Docker swarm, Cluster, Devops, Linux, Nodes

INTRODUCTION:

DevOps is very popular topic for the research. It is used to Automate and Integrate the processes between software development and IT teams. This helps in software testing, development. Teams can release software more authentically and speedily. DevOps team shares responsibility and gives faster feedbacks. Their Collaboration and Troubleshooting elements are the successful culture of DevOps.

If we talk about benefits of DevOps in a development and operation environment its actually life changing, as it reduces lead time, deployment done more frequently and results with higher-quality software in less time and less effort. It's all about collaboration and trust making a culture of responsibility sharing, faster feedback and transparency is the foundation of every high-performing DevOps team. As problem-solving and collaboration ranked as the most important element of a successful DevOps Culture. It is that change in mindset of looking at the development process holistically and breaking down the barrier between development and operations.

As the most of the task is automated, it helps to make release faster and easier. Lack of automation and review cycles slows the product release during this poor incident can kill time and work efficiency, it also disturbs the whole production environment.

Unplanned work is a reality that every team faces. Transitioning and prioritize unplanned work across different team and systems is inefficient and distracts from work at hand. However, through raised visibility and proactive retrospection, teams can better anticipate and share unplanned work.

The best practices for implementing DevOps such as shift left with CI/CD, implement automation, build with the right tools, agile project management, Monitor the DevOps pipeline and applications, teams gather feedbacks continuously, etc. Minimum cross-team communication, collaboration and transparency is crucial for smooth functioning.

A DevOps engineer is an IT specialist who have a wide range of knowledge of both operations and development which includes DevOps tool chain, infrastructure management, coding, system administration. DevOps engineer should have interpersonal skills and need to have a strong understanding of common system architecture, administration and provisioning.

There are many tools in DevOps which helps in smooth functioning such as -

- **Git** – It is one of the most popular tools in DevOps which is widely used in the software industry. Git enables to track the progress of the development work. To integrate Git with the DevOps workflow, there is a need to host repositories where the team members can push their work.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 2, February 2021

DOI 10.17148/IJARCCE.2021.10222

- **Jenkins** – Jenkins is the automation tool that helps many software development teams. It is an open-source CI/CD server that allows to automate the different stages of delivery pipeline that can be setup according to their needs.
- **Kubernetes** - It is a container orchestration platform that takes containerization to the next level. Kubernetes works well with the Docker or any of its alternatives. A Kubernetes cluster consists of one master and several worker nodes. The master node implementspre-definedrules and deploys the container to the worker nodes.
- **Docker** – Docker has been a number one container platform since its launch and continues to improve. It is one of the most important tools in DevOps. It makes distributed development possible and automates the deployment of the applications. It isolates applications into separate containers so that they become more secure and portable. Docker apps are also OS and platform independent. One can use Docker containers in place of virtual machines such as Virtual Box.

METHODOLOGY:

DevOps is a software development methodology that amalgamate the Software development with Information technology operations. They both are included in the entire production lifecycle, from design through the development process to production support.

The main aim of DevOps is to faster thedevelopment methodologies, quality assurance methodologies, deployment methodologies, Iteration and continuous feedback and faster time to market. DevOps compels consistency and increases up-time that emphasizes on environment stabilization. It also manages requirements and code-repository to shorten the development cycle. The Regiment processes and automated testing reduces defects.

Steps that includes in DevOps -

Plan: Firstly, we do task management and set schedules.

Code: Then do Code development and code review, source code management tools, code merging.

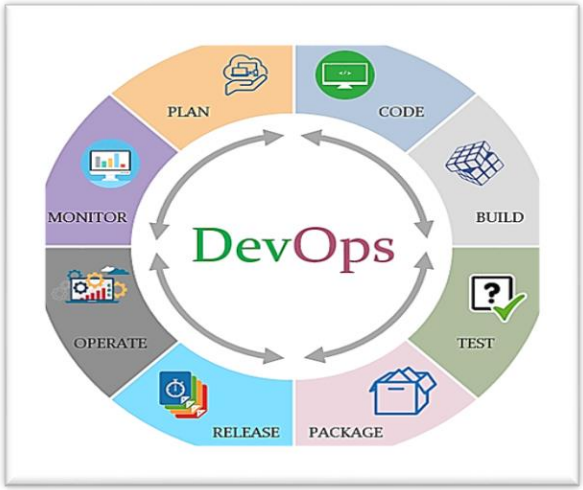
Build: It builds continuous integration tools, version control tools and build status.

Test: It does continuous testing tools which gives feedback on business risks and determine performance.

Package: It contains Artifact repository andApplication pre-deployment staging.

Release: It manages change management, release approvals and release automation.

Operate: Then we do infrastructure installation, infrastructure changes that means scalability, infrastructure configuration and management, infrastructure as code tools, capacity planning, capacity & resource management, security check, service deployment, Monitor: service performance monitoring, log monitoring, end user experience, incident management, high availability (HA), data recovery, log backup management, database management.



DevOps is holding up the businesses in a tremendous way. It's bridging the gap between ‘developers’ need for change and ‘operations’ resist to change and thus creates a smooth path for Continuous Development (CD) and Continuous Integration (CI). It requires new skills, new tools, and a new set of priorities. It will take time and a new perspective because DevOps is doing better today.

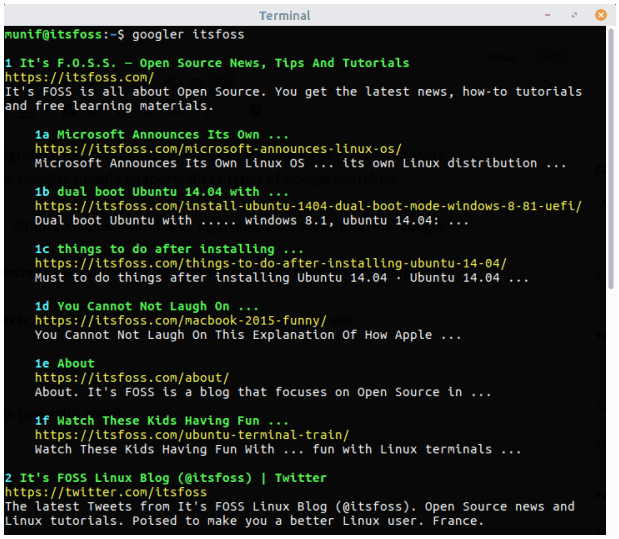
IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 2, February 2021

DOI 10.17148/IJARCCE.2021.10222



Advantages of Devops:

In addition to the benefits from any cloud deployment, there are advantages that are unique to DevOps as a Service:

- Cloud-based DevOps makes it easier to collaborate, putting all the tools in the cloud so they can be accessed by users anywhere.
- DevOps as a Service means faster testing and deployment. Generally, using cloud services enables increased release frequency. It also gives developers more computing power and data storage as they need it.
- Using DevOps as a Service hides the complexities of data and information flow, which means DevOps team members can focus on their specific tools without having to understand the entire tool chain. For example, a software developer can run tests using source code management tools, and an IT operations manager can make changes using configuration management tools.
- Using cloud services is a more data-driven process where everyone uses the same data set. This lends itself to better documentation and tighter quality control.
- DevOps as a Service does not have to function on its own; it can coexist with internal DevOps development and deployment processes. Using DevOps as a Service simply makes it easier to offload specific aspects of a project for better collaboration and faster turnaround.

Disadvantages of Devops:

Of course, DevOps as a Service is not a panacea for developing business applications. There are a number of disadvantages that have to be considered:

- Outsourcing a DevOps infrastructure requires a specific level of software development expertise, including an in-depth understanding of integration, infrastructure, and orchestrating workflow. You need the experts along with the tools for DevOps as a Service to succeed.
- Can you really clone a production environment in the cloud? Cloning an enterprise infrastructure for test purposes is complex and can lead to unforeseen compatibility problems. Of course, if your objective is to create a production environment, you can't use the cloud to clone something you don't have.
- Security is always a concern. The security team is usually not part of DevOps, and the DevOps team tends to choose speed over security when developing software. Using cloud services can create unnecessary risks and exposure, especially since it's the transport layer that is usually left unsecured; cyber criminals tend to use the transport layer for spoofing and man-in-the-middle attacks.

However, when used appropriately, DevOps as a Service can give you the best of both worlds, making optimal use of your in-house resources while taking advantage of the collaborative environment and fast turnaround of the cloud. Partnering with the right DevOps as a Service provider can give you greater agility and access to more DevOps expertise without sacrificing your existing DevOps infrastructure. And if you are considering a new DevOps strategy, DevOps as a Service can shorten time to deployment and give you greater versatility as you develop new business process applications.

REFERENCES

1: https://devops.com/
2. https://www.infoworld.com/article/3204171/what-is-docker-the-spark-for-the-container-revolution.html
3. https://www.docker.com/
4. https://www.atlassian.com/devops/what-is-devops