# Cloud Based DevOps Skill Assessment Application

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***Abstract*—Now a days many online tools are available to test the programming knowledge of the person like codechef. But in order to test the knowledge of the DevOps there is no such online tool available. So the aim is to develop the cloud based infrastructure to test the knowledge of DevOps of the examinee. The questions related to the DevOps will be given to the candidate along with the access to the terminal. The candidate has to do all the steps required to solve the problem given. The terminal Provided to the candidate is the communication link between the candidate and the allotted container. We are using containers rather than VMs, because containers are small,light-weighted and fast, one application can be packed in each container image. The Kubernetes will manage the containerized applications such as database storage and user specific command across a set of containers or hosts and provides mechanisms for deployment, maintenance, and application-scaling. The container runtime packages, instantiates, and runs user commands on containerized application. The output generated will be stored in a temporary file which will be verified with the desired output stored in a database.**

***Keywords*—DevOps, Orchestration, Containerization, Linux, Cloud computing, Parallel Computing, Networking**

## I. Introduction

DevOps is a software development methodology that combines software development with information technology operations . The goal of it is to shorten the systems development phases while also delivering fixes, features, and updates frequently in close alignment .The DevOps approach is to include automation and event monitoring at all steps of the software development .The focus on the developer collaboration enables a new approach to managing the complexity of real world problems. I believe the operations complexity breaks down into a few categories: configuration management , infrastructure and deployment automation, log and performance management, and monitoring. Below are some tools we have used to help solve these tasks. As part of Agile transformations as in the paper"Understanding DevOps & bridging the gap from continuous integration to continuous delivery" [2] in past few years we have seen IT organizations adopting continuous integration principles in their softwares delivery lifecycle, which has improved the efficiency of development teams. With the time it has been realized that this optimization as part of continuous integration alone is just not sufficient to make the entire delivery lifecycle efficient or is not driving the organizations efficiency.This paper tries to cover all aspects of Devops applicable to various phases of SDLC and specifically talks about business need, ways to move from continuous integration to continuous delivery and its benefits. Explores the market opportunities for cloud computing in India. Cloud Computing is a new paradigm in information technology (IT) and IT-enable services(ITES) that transform computing as a resource to computing as a service. It is a disruptive technology with influence pervading across all aspect of a modern economy.

### A. Configuration Management

Configuration management solves the problem of manually install and configure packages once the hardware is in place. The benefit of using configuration management solutions is that servers are deployed exactly the same way every time . If you need to make a changes across 100 thousand servers you only need to make the change in one system . In the operations environments we have worked in there were always strict controls on who could access production environment , who could make change, when changes could be made, who could physically touch hardwares , and who could access what data centers . In these highly regulated and process oriented enterprises the thought of blurring the lines between development and operation seems like a non-starter.

## II. Literature Review

Number of literatures pertaining techniques to DevOps and cloud computing published already and are available for public usage.As per Wotif Group [5]used DevOps principles to recover from the downward spirals of manual release activities that many IT departments face. Its approach involved the concept of making it efficient to do the working thing By defining the right things (deployment standards) for developments and operations teams and making it easy to adopt, Wotif drastically and effectively improved the average release cycle time.Containerization is a lightweight virtualization solution.

The paper presented in conference 2017 Seventeenth International Conference on Advances in ICT [4], DevOps is extended from certain agile practices with a mix of patterns intended to improve collaboration between development and operation teams.

The main purpose of this paper is to conduct a study on how DevOps practice has impacted to software quality. The secondary objective is to find how to improve quality efficiently. Automation is the most critical factor to improve the software quality. As per the results of multiple regression analysis, it has proved culture, automation, measurement and

sharing are important factors to consider to improve quality of the software.

In the paper presented in the International Conference on Software Engineering Companion [3] DevOps result in a series of software engineering tactics aimed at shortening the actionable operation of software design changes.

In the paper presented in ”Euromicro Conference on Software Engineering and Advanced Applications” [6] DevOps and continuous practices are attracting steadily growing attentions by both practitioners and researchers in the software engineering community. The terms are often used inconsistently, interchangeably and with unclearmeaning, however. By taking the positions that , this ambiguity and miscommunication renders the community great harm, their effects and interplay between them, reduce ambiguity.

GNU/Linux shell access through a web-browser for an embedded Linux e-learning system [7] represents The internet is growing rapidly and has a more impact on the education sector than it had ever before. This paper aims at describing a novel way toextend the e-Learning techniques used to the area of embedded Linux education. For these techniques, Open Source Software technologies such as AJAX, PHP, Apache have been used in an innovative way to impart embedded Linux education just by use of normal web-browsers which makethe learning system as easy as checking a mail. In this paper, ways of enabling the embedded devices Linux shell access through a web-browser isexplained, which is a key feature of the system. This improves scalability and accessibility for multiple users.

The paper represented in Establish new concept to develop evaluation system of examination questions and examination result. [8] This paper aims to establish a reasonable, objective, quantized evaluation standard of analyzing examination and score, and develop the evaluation index system of examination questions and examination result analyzing. A lot of reasonable and objective ideas such as examination difficulty, estimate score, objective difficulty and so on are risen and defined, and some related quantized calculation methods are given, and the examination result analyzing and examination principle software system which can make a quantized decision is programmed.

” Containerization and the PaaS Cloud ” [10] focus on Containerization is a lightweight virtualization solution. Apart from exhibiting benefits over traditional virtual machines in the cloud, containers are especially relevant for PaaS clouds to manage and orchestrate applications through containers as an application packaging mechanism.

” Task Based Automatic Examination System for Sequenced Test ” [9] represents Computer greatly influences our educational environment. Over the last few years, online automatic computer examination systems have been widely used for computer-based tests, but these systems are based on traditional question-answer examination style which is not fit for the sequenced test. The sequenced test should consider the context of the examinee.ex. the order of questions or the permissions of the examinee, to grade an examinee. This paper propose an effective and practical automatic examination architecturebased on task. The task is to abstract from the examination process and meet the requests of the sequenced test, such as order and dependency.

Our Project is having distributed environment. We are using DevOps Tools such as Kubernetes for generation of master and slave nodes. System will perform task of the evaluation of skills of the candidate.

### A. *Mathematical Model*

- Input: X = Answers for the questions in the test.
- Output: Y = Relative rank of candidate according to his performance in the test.

Let S = {U, N, T, S, status, result, F}
Where,

- U = { u1, u2, u3, .., ui.} Finite set of users (Candidates).
- N = { Master, Slave }
  Where,
  Master = Kubernetes master node.
  Slave = Kubernetes worker node.
- Slave = { slave1, slave2, ., slavei }
- T = { t1, t2, t3, ., ti } Finite set of test Scenarios.
- S = { s1, s2, s3, ., si } Finite set of scores of a user.
- status = { status1, status2, .., satatusi } Test status.
- Functionalities:
  Yes/No = authenticate (uname, passwd)
  Interface Candidate Web Brower (Wi)
  Si = get test Scenario Score(ti)

  Rank = apply ranking algorithm (ti, si)
  Result = generate test result.

### B. *Architectural Design*

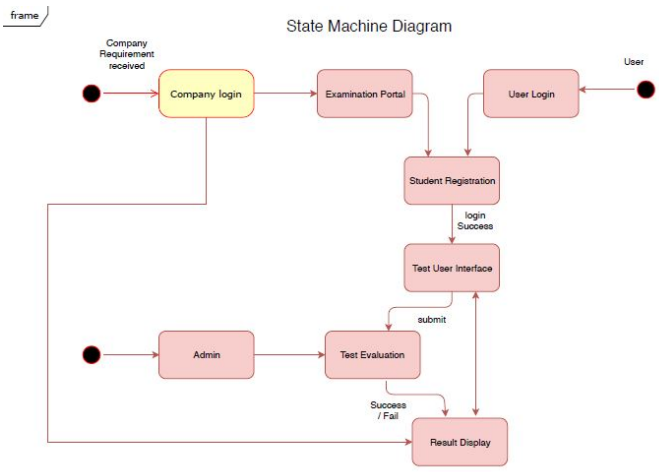


fig 1: Plan

## III. Conclusion

Companies that incorporate the DevOps operations to get more done, plain and simple. With a single team composed of cross-functional members all working in collaboration, DevOps systems can deliver the maximum speed, functionality, and innovation.Companies that uses this application will be easily able to create test depending on their specific requirements. This test scenarios will help company to easily evaluate candidate knowledge and thus they can find a right candidate for the desired post.

## Appendix A
## Working Of Kubernetes

To work with Kubernetes, we use Kubernetes API objects to describe our clusters desired state: what application or other workloads we want to run, what container images we use, the number of replicas, what network and disk resources we want to make available, and more.The Kubernetes Master is a collection of three processes that run on the single node in our cluster, which is designated as a master node. Those processes are: kube-apiserver, kube-scheduler and kube-controller-manager.Each individual non-master node in our cluster runs two processes kube-proxy kublet.


## Acknowledgment

We would like to express our deep sense of gratitude and respect towards our guide Prof.Amar More, Department of Computer Engineering, MIT Academy of Engineering.we have received from him while collecting data on this paper and throughout our studies. we whole-heartedly thank to our Dean Dr. Shital Kumar Jain for their guidance. we also indebted to all Sr. Engineers and others who gave us their valuable time and guidance. The various information and sources we used during my report completion find place in our report.


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