1 Group Id

10

2 Project Title

Cloud Based DevOps Skill Assessment Application

3 Project Option

Internal Project

4 Internal Guide

Prof. Amar More

5 Technical Keywords (As per ACM Keywords)

1. D. Software
    (a) D.2 SOFTWARE ENGINEERING
        i. D.2.6 Programming Environments
            A. Graphical environments
            B. Integrated environments
            C. Interactive environments
            D. Programmer workbench

6 Problem Statement

To develop a web based application to assess DevOps and Linux administration skills.

7 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.

8 Goals and Objectives

- Assess DevOps skills
- Assess Linux administration skills
- To provide a web based platform for assessment

9 Relevant mathematics associated with the Project

System Description:

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

Mathematical Model:

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.

10 Names of Conferences / Journals where papers can be published

- IEEE CLOUD 2018 - IEEE International Conference On Cloud Computing 2018, San Francisco, CA, USA
- CCGrid May, 2019 - 19th Annual IEEE/ACM International Symposium in Cluster, Cloud, and Grid Computing, Larnaca, Cyprus
- ICFEC 2019 - 3rd IEEE International Conference on Fog and Edge Computing

11 Review of Conference/Journal Papers supporting Project idea

1. **Cloud Computing Innovation in India: A Framework and Roadmap - White Paper 2.0," in Cloud Computing Innovation in India: A Framework and Roadmap - White Paper 2.0**

   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. While this has the potential of leapfrogging the economy of emerging market like India, the adoption and deployments in such countries poses a unique sets of technological, business, and regulatory challenges. Examines the viability of developing cloud computing markets, applications, and services in India.

2. **Understanding DevOps & bridging the gap from continuous integration to continuous delivery," Fifth International Conference on the Innovative Computing Technology (INTECH 2015), Pontevedra, 2015**
   As part of Agile transformations 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. Continuous delivery transformation in this paper is explained with a real life case study that how infrastructure can be maintained.

3. **DevOps: Introducing Infrastructure-as-Code," 2017 IEEE/ACM 39th International Conference on Software Engineering Companion (ICSE-C), Buenos Aires, 2017**
   DevOps result in a series of software engineering tactics aimed at shortening the actionable operation of software design changes. One of these many tactic is to harness infrastructure-as-code, that is, writing a blueprint that contain deployment specifications ready for orchestration in the cloud.It discusses all necessary elements and abstractions in writing and maintaining that blueprints, revolving around a key standard for its expression, namely,

the OASIS Topology and Orchestration Specification for Cloud Applications (TOSCA) industrial standards adopted by as many as 60+ big industrial players worldwide.

4. **Improve software quality through practicing DevOps," 2017 Seventeenth International Conference on Advances in ICT for Emerging Regions (ICTer), Colombo, 2017**
   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 conclusion it can be recommended to use DevOps to achieve high quality software.

5. **DevOps: Making It Easy to Do the Right Thing," in IEEE Software, vol. 33, no. 3, pp. 53-59, May-June 2016**
   Wotif Group 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.

6. **"Continuous practices and devops: beyond the buzz, what does it all mean?," 2017 43rd Euromicro Conference on Software Engineering and Advanced Applications (SEAA), Vienna, 2017**
   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.

7. **GNU/Linux shell access through a web-browser for an embedded Linux e-learning system," 2011 3rd International Conference on Electronics Computer Technology, Kanyakumari, 2011**
   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 to

extend 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.

8. **Establish new concept to develop evaluation system of examination questions and examination result," 2011 2nd International Conference on Artificial Intelligence, Management Science and Electronic Commerce (AIMSEC), Dengleng, 2011**
   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.

9. **Task Based Automatic Examination System for Sequenced Test," 2009 International Conference on Electronic Computer Technology, Macau, 2009**
   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.

10. **"Containerization and the PaaS Cloud," in IEEE Cloud Computing, vol. 2, no. 3, pp. 24-31, May-June 2015.**
    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.

12 Plan of Project Execution

	Task Name	Q2			Q3			Q4			Q1		
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Literature Survey												
2	Title Finalization												
3	Realize Objectives,Goals and Scope												
4	Create Modular Design												
5	Coding of Different Modules												
6	Documentation												
7	Integration of all Modules												
8	Testing and Correction												
9	Result Analysis												
10	Documentation												

Figure 1: Plan