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# Social Media Using Load Balance Microservices with Containers for Students

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**ABSTRACT:** Student social media using load balance microservices with containers, we have to use four models as Microservices, Load balance, Container, web server (NginX). Using these four models we have to implement the website. Microservices is a distinctive method of developing software systems that tries to focus on building single-function modules with well-defined interfaces and operations. Load balancing improves the distribution of workloads across multiple computing resources, such as computers, a computer cluster, network links, central processing units, or disk drives. Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource. Using multiple components with load balancing instead of a single component may increase reliability and availability through redundancy. Container basically used for storage purpose. container uses Docker algorithm. NginX is a web server. It used as a reverse proxy and load balancer.

**KEYWORDS:** Microservices, Load Balancer (Round Robin Algorithm), Containers (Docker Compose Algorithm), Web Server (NGINX).

### I. INTRODUCTION

It is system in which we are using services like load balance, container, and microservices. In social media we are uses three micro-services as user service, post service, and university service. Login service is highly secured by using one way encryption with the help of hashing algorithm. In this we uses a web server as NginX. Load balanced is done with the help of docker compose algorithm. Container is used for store the programs and run on any platform, container created using docker.

To explore the role of design in software, consider improves modularity. This makes the application easier to understand, develop, test, and become more resilient to architecture model. It parallelizes development by enabling small autonomous teams to develop, deploy and scale their respective services independently. Services in microservice architecture (MSA) are often processes that communicate over a network to fulfil a goal using technology-agnostic protocols such as HTTP. However, services might also use other kinds of inter-process communication mechanisms such as shared memory. Services in microservice architecture are independently deployable. The services are easy to replace. Services can be implemented using different program languages, databases, hardware and software environment, depending on what fits best.

A load balancer is a device that distributes network or application traffic across a cluster of servers. Load balancing improves responsiveness and increases availability of applications. Load balancing improves the distribution of workloads across multiple computing resources, such as computers, a computer cluster, network links, central processing units, or disk drives. Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource. Using multiple components with load balancing instead of a

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single component may increase reliability and availability through redundancy. Load balancing usually involves dedicated software or hardware, such as a multilayer switch or a Domain Name System server process. Containers are easily packaged, lightweight and designed to run anywhere. Containers are frequently used to run each individual Microservice, serving as convenient, lightweight “envelopes” that allow software to be truly portable. As few or as many Containers needed for each Microservice can be dynamically created or destroyed based on load, so automation is crucial, as the rapid creation of Containers enables the scaling and high availability of Microservices. Containers are isolated workload environments in a virtualized operating system. They speed up workload processes and application delivery because they can be spun up quickly.

## II. LITERATURE SURVEY

**[2016] ALAN SILL:** The Design and Architecture of Microservices

The basic approach of separating services into functions that can interact via programming interfaces has been with us for some time.

**[2017] PAOLO DI FRANCESCO:** Architecting Microservices

This paper reports on a PhD research project addressing three different challenges concerning MSA: (i) the identification of the key properties of microservice architectures, (ii) the identification and investigation on a description language for designing and analyzing architectures, (iii) the identification of the factors that impact the process of migrating existing applications towards MSA.

**[2018] CLAUS PAHL:** Architectural Pattern for Microservices

Microservices are increasing their popularity in industry, being adopted by several big players such as Netflix, Spotify, Amazon and many others and several companies are now following the trend, migrating their systems to Microservices. Microservices are increasing their popularity in industry, being adopted by several big players such as Netflix, Spotify, Amazon and many others and several companies are now following the trend, migrating their systems to microservices.

## III. METHODOLOGY

In this system there are three modules, these are User module, University module, Post module. And also various technologies are used such as Microservices, Load Balancer, and Docker. And Round Robin Algorithm, Docker Algorithm, Hash Function Algorithm these algorithms are used.

### USER MODULE:

In User module, there are two fields User Registration and User Login. User can register using user registration. A registration form is list of fields that a user will input data into and submit to the database. System is used registration form to sign up the user for services. And user can login the system using user login. There are separate username and password to all users using this username and password user can login the system.

### POST MODULE:

Second module is Post module, in this module; user and University both can post any texts. Also save and tag the text, in this module there is one more functionality is available to user that is category. This functionality filters the data or post according to their category or subject. Because of this user can find any specific notice or post easily. University can post the various notices for user. User can also post the various text messages.

### UNIVERSITY MODULE:

Third module is University module. In this module, there is one more service of login for university. University can login the system using university login. Using this login, university can upload syllabus, timetable and result. Also university can post the texts in post service. And post the various notices for student in post service.

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### TECHNOLOGIES USED:

1. **Microservices:** It improves modularity. It makes the application easier to understand, develop and test. Microservices are independently deployable. Easy to replace.
2. **Load Balancer:** Load balancing is a technique used to distribute workloads uniformly across servers or other compute resources to optimize network efficiently, reliability and capacity. Load balancers handle incoming requests from users for information and other services. They sit between the servers that handle those requests and the internet.
3. **Container:** Containers are easily packaged, lightweight and design run anywhere. Multiple containers can be developed in a single VM. A container need not be used for a microservice. Containers hold the components include files, environment variables, dependencies and libraries.

### TOOLS USED:

1. **MySQL:** MySQL is an open source RDBMS i.e. Relational Database Management System. It supports a number of SQL data types in several categories: numeric types, date and time types, string (character and byte) types, and spatial types.
2. **JAVA:** JAVA is a general-purpose programming language that is class-based, object-oriented, and specially designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere".
3. **IntelliJ IDEA:** IntelliJ IDEA is a java integrated development environment for developing computer software. It is developed by JetBrains, and is available as an Apache 2 Licensed community edition. Both can be used for commercial development.
4. **Docker:** Docker is a platform for packaging, developing, and running applications in containers. It can run containers on any system that supports the platform. Docker is open source. This means that anyone can contribute to Docker and extends it to meet their own needs if they need additional features that aren't available out of the box.

In Figure 1 it shows the System Design.

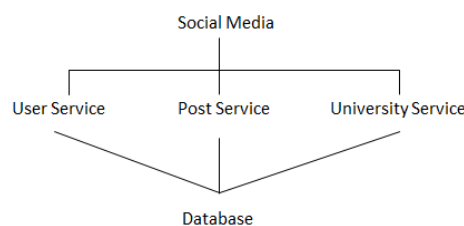


Fig 1: System Design.

### ALGORITHMS:

1. **Round robin Algorithm:**  
Round robin is one of the algorithm employed by process and network schedulers in computing. as the term is generally used, time slice(also known as time quanta) are assign to each process in equal portions and in circular order, handling all processes without priority. This algorithm is used to handling the multiple user at a time. That is this algorithm is used for Load Balancing.
2. **Hash Function Algorithm(MD5):**  
The MD5 message-digest algorithm is a widely used hash function producing a 128 bit hash value. The MD5 hashing algorithm is a one way cryptographic function that accepts a massage of any length as input and returns as output. Fixed lengths digest value to be used for authenticating the original massage.

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## 3. Docker Compose Algorithm:

Docker Compose is an algorithm for defining running multiple container Docker applications. Docker compose works in all environments: production, staging, development, testing as well as CI workflows. Compose has traditionally been focused on development and testing workflows, but with each release making progress on more production oriented features.

## IV. PROPOSED SYSTEM

In this System, there are three services such that User service, University Service, Post service. In this system also used various technologies like Microservices, Load balancer, Docker, Containers. Load balancer is used for handle the load of system that is It handles multiple users at a time. Containers are used to holds the components. Also various Algorithms are used for this system. These algorithms are Docker algorithm, Hash function algorithm, Round robin algorithm.

In this system user can login using User service. Also user can post any text or message using post service. There is one more service that is University service, in this System University can upload the syllabus, timetable, result for students or user. Also university can upload the notices in post service. In post service, there are various types of posts which uploaded by user and university. There is one more facility that, there uses filter that is for the filtering the posts along with the category.

In this system, various algorithms are used. Round robin algorithm is a Scheduling algorithm which used for Load balancing. Also Hash Function algorithm is cryptographic algorithm which used for security purpose. There is one way encryption for high security. And Docker algorithm is used for Docker Containerization. Figure 2 shows the System Architecture of the Proposed System.

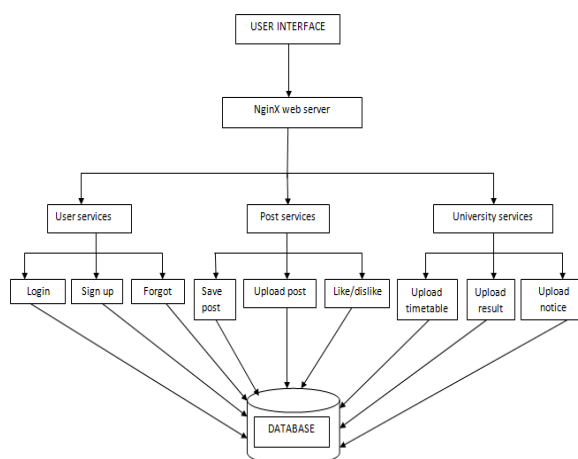


Fig 2: System architecture.

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## V. EXPERIMENTAL RESULTS WITH FIGURES AND GRAPHS

In this scheme, we suggested a Social media system for user. System adds users using User Service. Using Registration form. Then user can enter system using login option, in this option systems gets username and password. All users have their own unique username and password. These username and password are secured using Hash function algorithm. Registration Form (Fig 3) and Home Page (Fig 4) is as follows:

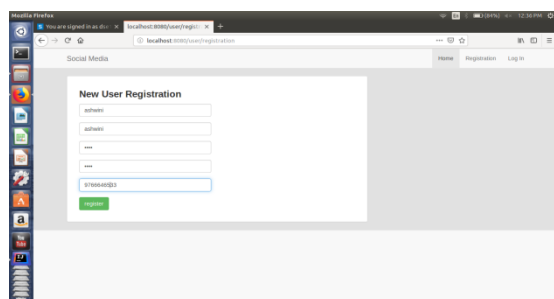


Fig 3: Registration Form

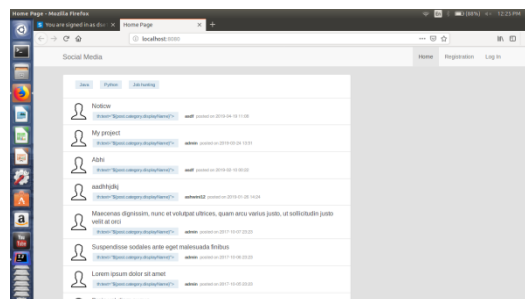


Fig 4: Home page.

When user enters in system, there are two options for user 1<sup>st</sup> is to post anything or to view the post. For this option there is Post Service is present. That is user can post anything (text) using post service. For post the text there is option that quickly post. In post service user and university both can post the information. The Post service (Fig 5) is as follows:

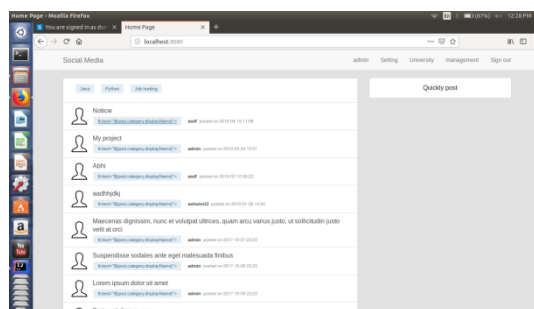


Fig 5: Post Service.

There is one more service that is University Service. In this Service University can upload syllabus, timetable, and result. And also university can post the information which is useful for the user. Also university can post various notices on post service. There is separate login system for university for manage of university data. University service (Fig 6) is as follows:

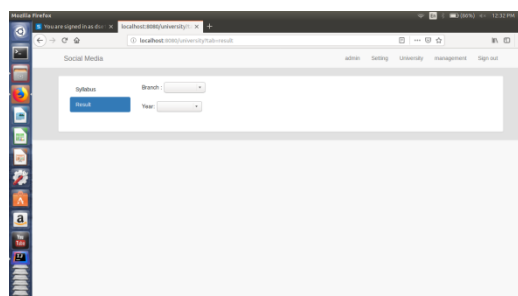


Fig 6: University service.

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## PERFORMANCE RESULT:

In Figure 7 it shows the Existing System and Figure 8 shows the Proposed System.

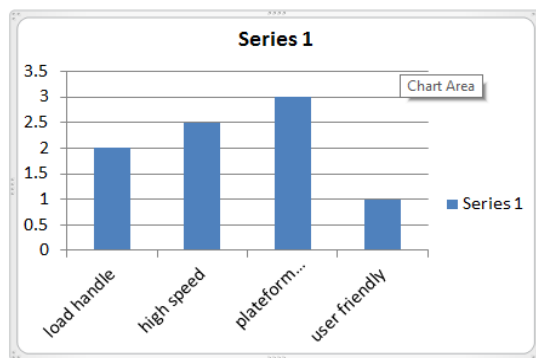


Fig 7: Existing System.

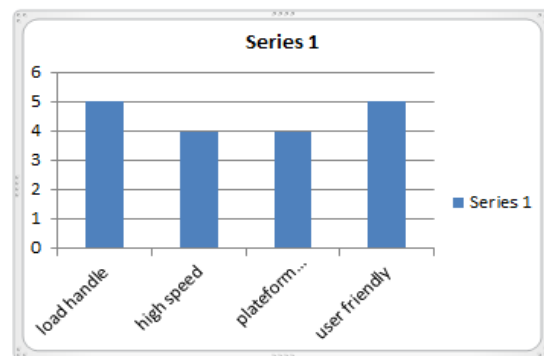


Fig 8: Proposed System.

## VI. CONCLUSION

The system provides a user friendly interface. Everyone can use this system easily. The system is developed with modular approach and also based on advanced technologies like microservices, load balancer, containers. Because of using these technologies, system will reduce time consumption, Balancing Load over website and also system provides high security for that one way encryption (Hash function) is used.

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