CLOUD BASED E-LEARNING PLATFORM

(Project)

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BONAFIDE CERTIFICATE

This is to certify that this project report entitled "**CLOUD BASED E-LEARNING PLATFORM**" is submitted to Srinivas University Institute of Engineering and Technology, Mukka, is a bonafide record of work done by **ANJALI UPADHYAYA** under my supervision.

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ABSTRACT

Cloud computing is becoming an adoptable technology for many of the organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet. Cloud computing is growing rapidly, with applications in almost any area, including education. Now a day, e-learning is also becoming very popular and powerful trend, which is also broad. E-learning systems usually require many hardware and software resources. This project presents the benefits of using cloud computing for e-learning. There are many educational institutions that cannot afford such investments, and cloud computing is the best solution, especially in the universities where the use of computers are more intensive and what can be done to increase the benefits of common applications for students and teachers. In this project we are going to deploy a E-learning Portal using WordPress through Amazon Web Services (AWS).The project mainly consists Amazon Cloud Services. The main aim of this projects is to provide E-learning Courses. Technologies used – Amazon RDS, Amazon SNS, Amazon Route53, Amazon S3, Amazon VPC, Amazon LightSail, IAM, Amazon Lex, WordPress.

1. INTRODUCTION

1.1 The Domain

Cloud Computing is a new paradigm that provides an appropriate pool of computing resources with its dynamic scalability and usage of virtualized resources as a service through the Internet. The resources can be network servers, applications, platforms, infrastructure segments and services. Cloud computing deliver services autonomously based on demand and provides sufficient network access, data resource environment and effectual flexibility. This technology is used for more efficient and cost-effective computing by centralizing storage, memory, computing capacity of PC's and servers. With the tremendous advantages of cloud computing, we expect this technology to revolutionize the field of e-learning education. Cloud computing applications provide flexibility for all educational universities, schools and institutions. The cloud platform in institutions' campuses provides effective infrastructure and deployment model for their dynamic demands. The benefits of cloud computing can support education institutions to resolve some of the common challenges such as cost reduction, quick and effective communication, security, privacy, flexibility and accessibility. "Cloud computing" is the next accepted action in the evolution of on-demand information technology services and products. Cloud computing allows to move the processing effort from the local devices to the data center facilities. The software is seen as a service and the applications and data are stored on multiple servers that can be accessed from the Internet. However, in traditional web-based e-learning mode, system construction and maintenance are located in interior of educational institutions or enterprises, which results in a lot of problems existed. cloud computing has many advantages such as expected performance, reduced upfront investment (i.e., software, hardware, and professional staff to maintain servers and upgrade

software), high availability, reduced launching time, infinite scalability, tremendous fault-tolerance capability, and accessibility, enhanced collaboration, and mobility, allow users to use any device, such as a mobile phone, personal computer (PC) etc. Cloud computing is becoming an attractive technology due to its dynamic scalability and effective usage of the resources; it can be utilized under circumstances where the availability of resources is limited. This paper presents the impact of using cloud computing upon e-learning solutions development.

1.2 The Problem

In this final project, you will create a highly available (HA), scalable and fault-tolerant deployment of the WordPress application. You will deploy the WordPress application in such a way that the application server, load balancer and database will scale independently of one another. You will also deploy the application's components like the webserver and database into two availability zones to distribute it and guard against failure of the anyone availability zone. The WordPress application will be deployed in a stateless fashion so that we can add or remove web application servers in response to the requests flowing into the system. Finally, we create a CloudFront distribution as CDN and change the configuration of WordPress.

Although many platforms are providing e-learning web application and providing courses to its users, but we are going to develop e-learning web application through AWS.

1.3 The Technology

AMAZON WEB SERVICES: Amazon Web Services, Inc. (AWS) is a subsidiary of Amazon that provides on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered pay-as-you-go basis. These cloud computing web services provide distributed computing processing capacity and software tools via AWS server farms. One of these services is Amazon Elastic Compute Cloud (EC2), which allows users to have at their disposal a virtual cluster of computers, available all the time, through the Internet. AWS's virtual computers emulate most of the attributes of a real computer, including hardware central processing units (CPUs) and graphics processing units (GPUs) for processing; local/RAM memory; hard-disk/SSD storage; a choice of operating systems; networking; and pre-loaded application software such as web servers, databases, and customer relationship management (CRM).

CLOUD COMPUTING: Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth. Cloud computing consists of three distinct types of computing services delivered remotely to clients via the internet. Clients typically pay a monthly or annual service fee to providers, to gain access to systems that deliver software as a service, platforms as a service and infrastructure as a service to subscribers. Clients who subscribe to cloud computing services can reap a variety of benefits, depending on their particular business needs at a given point in time. The days of large capital investments in software and

IT infrastructure are now a thing of the past for any enterprise that chooses to adopt the cloud computing model for procurement of IT services.

2. SYSTEM ANALYSIS

2.1 Literature Review

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. Cloud computing service models share five common essential characteristics that distinguish cloud computing from other computing technologies

1. On-demand self-service, where the consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider;

2. Broad network access, where the capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations);

3. Resource pooling, where the provider's computing resources are pooled to serve multiple consumers using a multitenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand;

4. Rapid elasticity, where capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand; and

5. Measured service, where cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts).

WORDPRESS:

WordPress is web or online publishing software or service you can use to create and design our own website or web application or blog. Back it was released in 2003, the WordPress has become one of the most popular web publishing software service platforms. More than 50% of entire websites in the world are designed and created in WordPress. WordPress enables us to build/create and manage your own fully designed website using just your web browser by having a good internet connection and without having to learn or write a single line of code.

AMAZON WEB SERVICES(AWS):

Amazon Web Services is the most often used, extensive also globally adopted and used cloud platform, offering many fully featured services from data centers globally and locally like Amazon Services. Numerous customers and users including start-ups, biggest enterprises and other governments are using AWS to lower costs, to increase computation speed, and to the fact that AWS is a reliable service. AWS is a cloud computing platform that offers numerous services that are fast, reliable, cost-effective, and easy to use. Amazon Web Service is a cloud service provider offered by Amazon. AWS is a combination of three services as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) offering.

2.2 Existing System

In existing system Web Application, they deploy a Dynamic E-Learning Portal Amazon Web Services (AWS). The project mainly consists of 10 Amazon Cloud Services and Google Firebase. Technologies used— Amazon RDS, Amazon SNS, Amazon Route53, Amazon S3, Amazon VPS, Amazon LightSail, Amazon Transfer Family, IAM (Identity Access Management), WordPress and Firebase by Google.

And some other e-learning web applications are developed using scripting, design and styling languages ex- Udemy,coursera ex..

2.3 Proposed System

In our project we are developing E-learning web application with the help of WordPress and then we are deploying it with the help of AWS services like Amazon CloudFront, Amazon API gateway, ELB, VPC, RDS, S3, EC2, AMI, Amazon LEX

Along with this a smart chatbot for the user
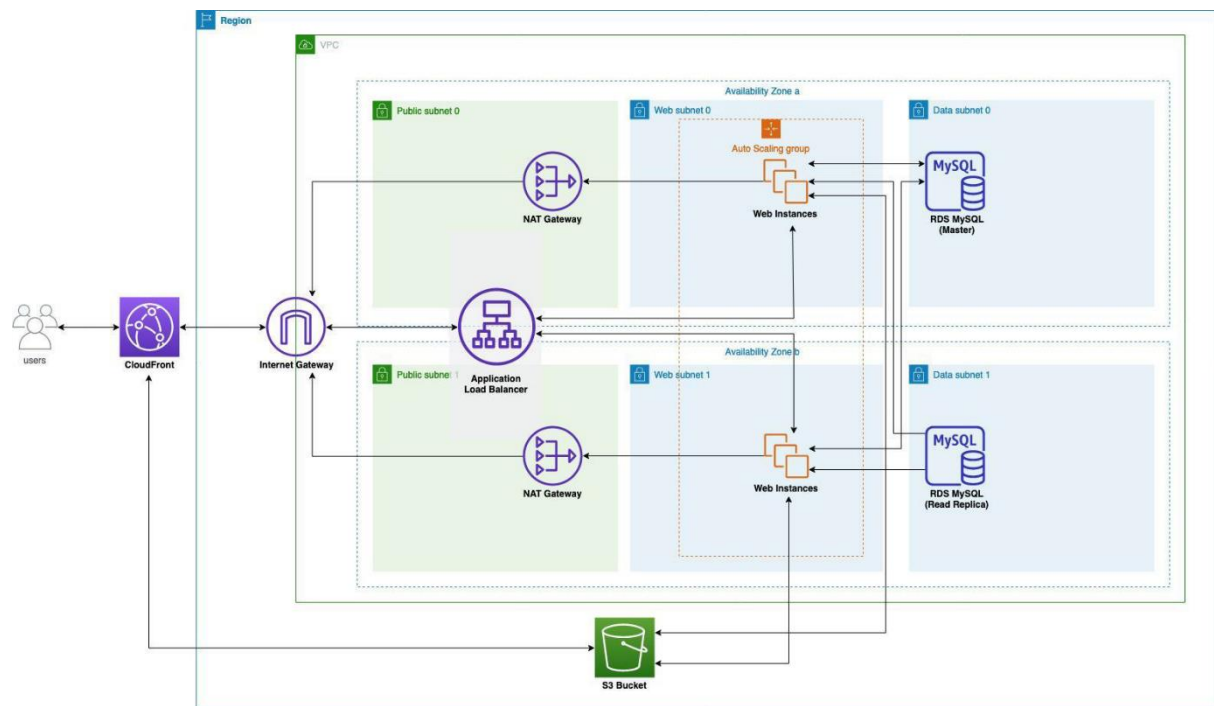
2.4 Hardware and Software Specifications

- AWS services
- 512 MB memory
- 512 Bandwidth
- 20 GB SSD Disk
- 1 Virtual CPU
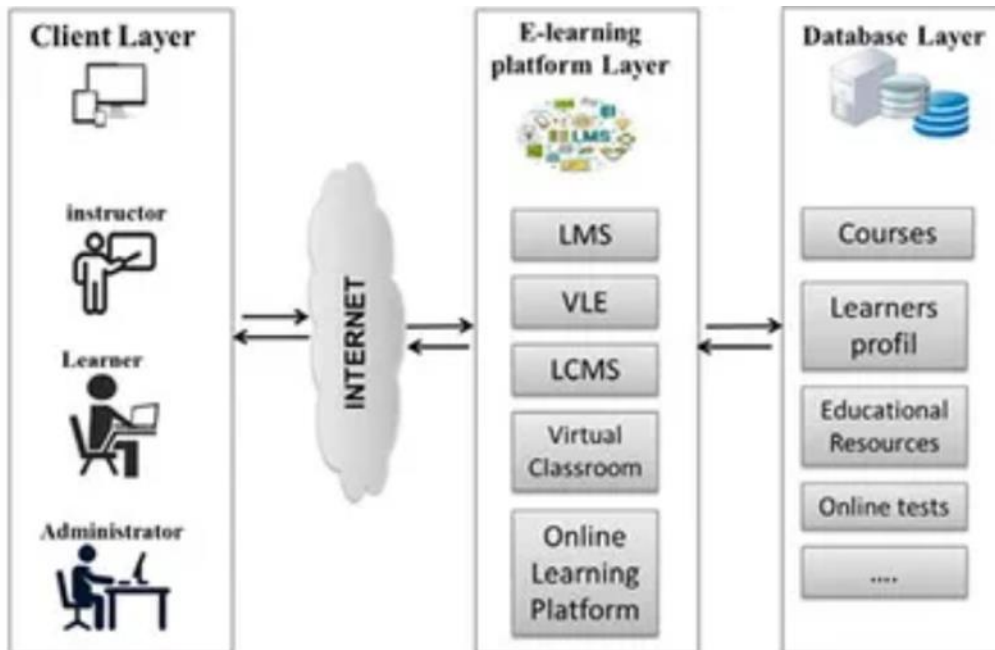- Laptop or computer
- Web Browser

3.SYSTEM DESIGN

3.1 Module Description

- Course Management System: A course management system is a section which is provided for accessing the course contents in various formats, manages student enrolment, and monitors the performance of a student.

- Student Portal: Student portals involve the information on courses offered, transcripts, exam schedules, department contact numbers, timetables, and email programs. It is generally used to describe the login page in which students can enter the name of the user and password to access educational program for the organization and other learning materials.

- Online Assignment Tool: Assignment tool permits the students for submitting the tasks online and their online feedback can be observed. It allows for setting up a location for every student to present an assignment. It is structured for both individual student and group's submission. Students can submit a wide range of file types and links for web-based items. It is an effective method to deploy, receive, and digitally grade assignments for the student.

3.2 Architecture Diagram

3.3 Working Diagram

Client Layer
- instructor
- Learner
- Administrator

INTERNET

E-learning platform Layer
- LMS
- VLE
- LCMS
- Virtual Classroom
- Online Learning Platform

Database Layer
- Courses
- Learners profil
- Educational Resources
- Online tests
- ....

3.4 Use case diagram

E-LEARNING SYSTEM

REGISTER

SIGN IN

SEARCH COURSE

SELECT COURSE

CHAT

SIGN OUT

STUDENT

ADMIN
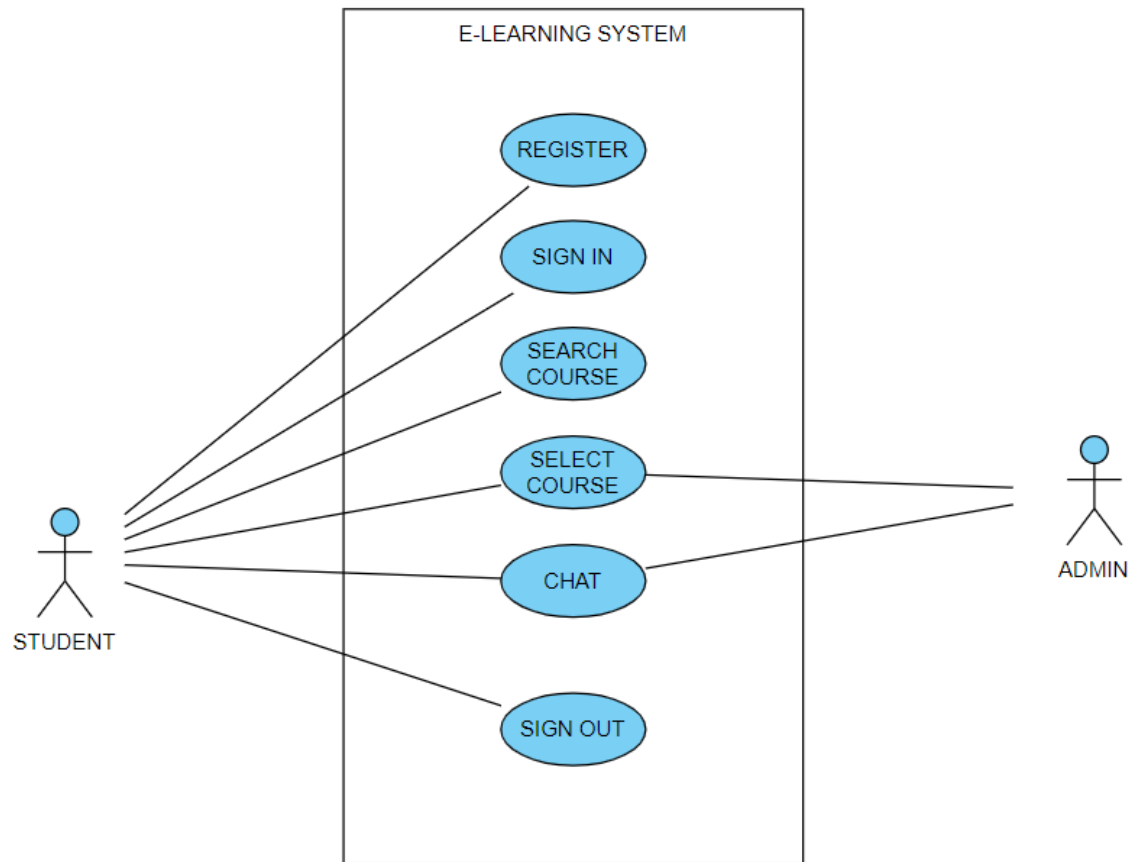
4.IMPLEMENTATION

1. Open Amazon Management Console
2. Open amazon S3 service
3. Create S3 bucket to store materials related to courses .
4. Create A VPC

    - Name the VPC
    - Create an Internet gateway.
    - Attach Internet Gateway with VPC
    - Create 2 subnets.
    - Create public route table.
    - Attach one subnet with route table

5. Launch an EC2 instance inside a public subnet where you will deploy the WordPress website.

    - Visit the EC2 console and click Launch Instances
    - In Choose an Amazon Machine Image (AMI) page, select Amazon Wordpress image from AWS marketplace,
    - In Choose an Instance Type page, select t2.micro
    - Click Next: Configure Instance Details button
    - In Configure Instance Details page
    - For Network, select the VPC you have created in the last STEP
    - For Subnet, select PublicSubnet1
    - Click Next: Add Storage → Next: Add Tags
    - For Assign a security group, select Create a new Security Group
    - For the Security group name, enter public-instance-sg

- In the pre-created rule,For Source, select My IP, your IP will be auto-detected, and click Review and Launch → Launch
- Select Create a new key pair, Enter the Key pair name and click Download key pair
- Finally, Launch the instance

6. launch MySQL database in a private subnet
- Visit RDS console, click Create Database
- For Engine options, select MySQL
- For Templates, select Free tier,
- In Settings section,
- For DB identifier, enter wordpress,
- For Credentials Settings, enter your Master username and Master password(for example: #12345678aA)
- In Connectivity section,
- For Virtual private cloud (VPC), select Vpc, you created in last time
- Click Additional connectivity configuration to show more configuration
- For Public access, select No
- For VPC security group, select Create new and enter db-sg in New VPC security group name
- Scroll down and click Additional configuration,
- For Initial database name, enter wordpress,
- Finally, click Create database

7. Modify security group of RDS and EC2 instance
- Visit EC2 dashboard, select public-instance-sg
- Click Edit inbound rules button

- Click Add rule, For Type, select MYSQL/Aurora,
- For Source, select custom and find the db-sg, and click Save rules
- Click Add rule, For Type, select HTTP,
- For Source, select My IP , and click Save rules
- Visit Security Groups page, select db-sg,
- Click Edit inbound rules button
- Click Add rule, For Type, select MYSQL/Aurora,
- For Source, select custom and find the public-instance-sg, and click Save Rules

8. Set Up the Wordpess Environment
    - Visit EC2 console,
    - Connect to instance
    - Create a E-learning website in wordpress
    - Setup RDS database connection using plugins for student registration
    - Add courses
    - Create dashboard, home page etc for the website
9. Set up Elastic Load Balancers for the website to handle load
10. Setup Cloudfront distribution to set domain name

5.MOTIVATION TO IMPLEMENT

- To provide E-learning platform for the students
- Cost-effective
- Availability
- Time management
- To help students to gain more knowledge

6.CONCLUSION

E-learning has become a popular way of learning, and this project focuses on developing a dynamic e-learning portal using WordPress through Amazon Web Services (AWS).

The literature survey explored the existing literature on e-learning, WordPress, and the technologies used in this project.

The literature revealed that e-learning is a growing market, and WordPress is an ideal platform for building e-learning portals.

Additionally, AWS offer several services that are essential for building an e-learning portal.

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