

CLOUD COMPUTING BASED E-LEARNING WEB APPLICATION SYSTEM

Submitted in partial fulfillment of the requirements for
the award of
Bachelor of Engineering degree in Computer Science and
Engineering

By

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SCHOOL OF COMPUTING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC
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SALAI, CHENNAI – 600 119**

MARCH - 2021



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this project report is the bonafide work of **M. HARI PRASAD (Reg. No. 37110264)** and **JANGITI SANDEEP (Reg. No. 37110284)** who carried out the project entitled "**CLOUD COMPUTING BASED E-LEARNING WEB APPLICATION**

SYSTEM" under my supervision from **DECEMBER 2020** to **March 2021**.

Internal Guide

Dr. SUJA C MANA, M.E., Ph.D.,

Head of the Department

Submitted for Viva voce Examination held on _____

Internal Examiner

External Examiner

DECLARATION

I **JANGITI SANDEEP** hereby declare that the Project Report entitled “**CLOUD COMPUTING BASED E-LEARNING WEB APPLICATION SYSTEM**” is done by me under the guidance of **Dr. SUJA C MANA, M.E., Ph.D.**, Department of Computer Science and Engineering at Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Computer Science and Engineering.

DATE:

PLACE: CHENNAI

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management of SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala, M.E., Ph.D., Dean**, School of Computing, **Dr. S. Vigneswari, M.E., Ph.D., and Dr. L. Lakshmanan, M.E., Ph.D., Heads of the Department** of Computer Science and Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. SUJA C MANA, M.E., Ph.D.**, for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

ABSTRACT

In the present-day scenario of the education system, it is very difficult for the education institutes/colleges to provide quality education to the students. The number of increasing infrastructure & facilities are still not making much progress due to the centralized approach but with the use of information technology the problems faced by the students and the educational institutes can be solved. Internet now a days is accessible from maximum telecommunication devices like desktops, laptops, tablets, mobiles.

Making it more distributed compare to any centralized entity. Cloud computing is widely used in many fields due to its more advantages the services provided by the cloud computing can add good impact to educational institutes by reducing the cost of infrastructure compared to present working system.

E-learning is also becoming very popular and powerful trend, which is also broad. E-learning systems usually require many hardware and software resources. 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 is more intensive and what can be done to increase the benefits of common applications for students and teachers.

Advantages: Easy implementation: Cloud hosting allows business to gain the same applications and business processes without having to deal with the backend services. Readily manageable by the Internet, a cloud infrastructure can be used by enterprises easily and quickly.

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CHAPTER 1 INTRODUCT ION

E-LEARNING

E-learning includes all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. This often involves both out-of- classroom and in-classroom educational experiences via technology, even as advances continue regarding devices and curriculum. Abbreviations like CBT (Computer-Based Training), IBT (Internet-Based Training), or WBT (Web-Based Training) have been used as synonyms to eLearning. E-learning is the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities, and digital collaboration. Content is delivered via the Internet, audio or videotape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video, and audio. It is commonly thought that new technologies can make a big difference in education.

CLOUD COMPUTING

Cloud computing is a term referred to as storing and accessing data over the internet globally. It doesn't store any data on the hard disk of your personal computer in this data center used for storing purposes. In cloud computing, you can access data from a remote server which is easier for retrieving data.

Cloud computing is a popular option for people and businesses for several reasons including cost savings, increased productivity, speed, and efficiency, performance, reliability, and security.

ADVANTAGES OF CLOUD COMPUTING: -

Easy implementation: Cloud hosting allows a business to gain the same applications and business processes without having to deal with the backend services. Readily manageable by the internet, a cloud infrastructure can be used by enterprises easily and quickly.

Accessibility: Access your data anywhere, anytime, and at anyplace. An Internet cloud infrastructure increases enterprise productivity and efficiency by providing your application is always accessible. This allows for easy collaboration and sharing among users in multiple locations and regions over the world.

No hardware required: Since everything will be hosted in the cloud that is over the internet, a physical storage center is no longer needed. However, a backup could be worth looking into in the event of a disaster that could leave your company's productivity stagnant.

Cost per head: Overhead technology costs are kept at a minimum sum with cloud hosting services, enabling businesses to use the extra time and resources for improving and using the company infrastructure.

Flexibility for growth: The cloud is easily scalable so companies can add or subtract resources based on their needs and can easily perform tasks. As companies grow, their system will grow with them.

Efficient recovery: Cloud computing delivers faster and more accurate measures of applications and data. With less downtime, it is the most efficient method for a recovery plan.

CHAPTER 2

AIM AND SCOPE

AIM OF PROJECT

This project aims to offer flexible learning possibilities in degree and continuing education and also in lifelong learning. To decrease the proportion of lectures and increase the proportion of individual work in the study process. And also, to make information and study materials better available for learners. To diversify the study process and make it more interesting, efficient, and contemporary. Web-based learning enables us to offer alternative learning possibilities for people with special needs, from remote areas, women with small children, full-time workers, and Estonians living abroad.

OBJECTIVES

E-Learning is essential in current trends and combining eLearning with Cloud computing gives more benefits. Cloud computing delivers services autonomously based on demand and provides sufficient network access, data resource environment, and flexibility by keeping this point in view, implementation of the system will be done.

SCOPE

Images have been shown to greatly support the learning process. People absorb more knowledge by establishing an interactive connection to study content. Also, the videos have the particularity of including a lot of information in a short period. E-learning videos are a dynamic way to study online, especially in these quarantine days when it is recommended that children are not attending schools. Being at home does not represent a disadvantage for education as the different technological instruments that we have today help us make it possible to continue our learning process without having to move to another place. You can take a few seconds of your day and watch an educational video to help you better understand a topic and, in this way, you will take advantage of all this preventive time at home.

ADVANTAGES OF E-LEARNING: -

Learn from Anywhere, At Any Time

Save Money and Time

Learn at Your Own Pace

Recognition of Online Degrees

DISADVANTAGES OF E-LEARNING: -

Chances of Distraction are Very High

Fraudulent online Courses

Cannot Do Courses that Require Labs/Workshops

CHAPTER 3

SYSTEM DESIGN & METHODOLOGY

PROPOSED SYSTEM

The architecture of the proposed system is shown in the figure. The architecture diagram shows the overall flow of the proposed E-Learning System. There will be admin and user. Admin can dump the data in web application and manages, controls all the activities of the application. The user has to register in the web application and fetch, view data that was added by the admin. The web application is hosted in the cloud server. Adding and fetching information by admin and user is done by using MySQL. And also, we implemented a user-friendly and interactive environment for the users. We improved the proper security of data. We will provide better service for the users.

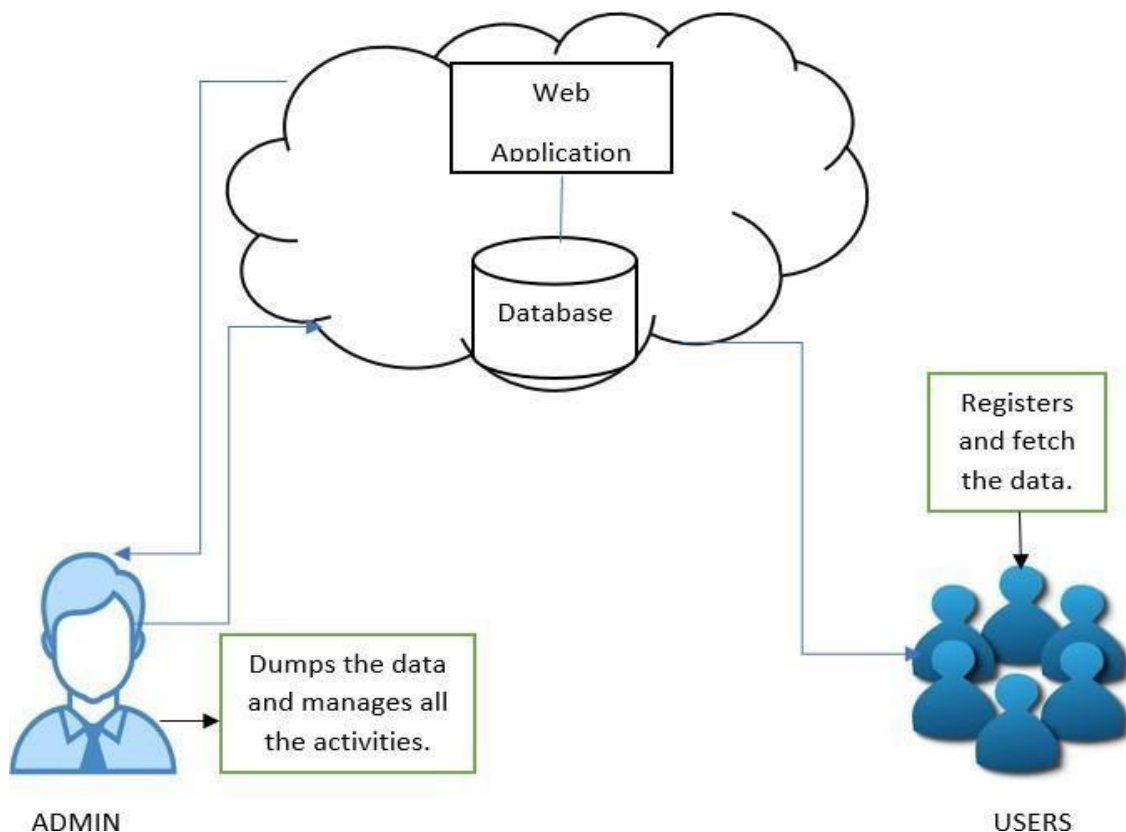


Fig 3.1: PROPOSED SYSTEM

WORDPRESS

WordPress is web publishing software you can use to create your website or blog. Since it was released in 2003, WordPress has become one of the most popular web publishing platforms. And today it powers more than 35% of the entire web everything from hobby blogs to some of the most popular websites online.

WordPress enables you to build and manage your full-featured website using just your web browser without having to learn how to code. If you have ever used a text editor like Microsoft Word, you will be right at home with the WordPress Editor. WordPress is released under an **Open-Source** license which means you can download and use the WordPress software you like for FREE. But it also means that hundreds of volunteers from all around the world are constantly working to improve the WordPress Software.



ADVANTAGES OF WORDPRESS:

- Simple and easy to use
- Attractive design options
- Best Search Engine Optimization (SEO)
- Open-source
- Responsive

DISADVANTAGES OF WORDPRESS:

Needs Lots of Plugins for Additional Features

Slow Page Speed

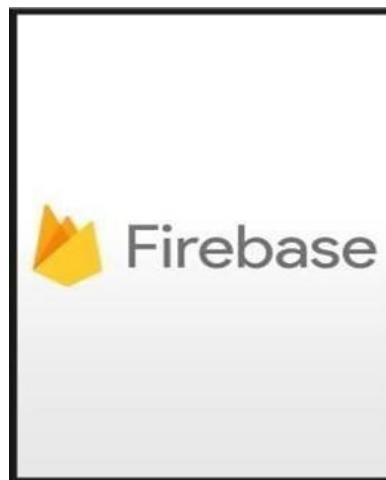
Website Can Go Down Without notice

Frequent theme and Plugin Updates

GOOGLE FIREBASE

Firebase is a platform developed by Google which is used to create mobile and web applications. It is a Google-backed application development software that enables developers to develop iOS, Android, and Web apps. Firebase provides a set of tools for reporting app crashes and fixing app crashes, Authentication, product experiment, and tracking analytics.

We have used Google Firebase in our project to Authenticate the Users of Our web application.



Authentication: -

Google Firebase Authentication creates the task easy for developers to build secure authentication systems and enhances the sign-in experience for users. This feature offers a complete identity solution, supporting email and password accounts, phone authentication.

Firebase auth has a built-in email or password authentication system. It also supports OAuth2 for Google. In Our Project, we focused on email/password authentication for the most part. Firebase Authentication will directly integrate into the Firebase Database, so you can use it to control access to your data. To allow a user to check-in into your app, you initially get authentication credentials from the user.

Then those credentials are often the user's email address and password or an OAuth token from a federated identity provider. Then you will be able to send these credentials to "Firebase Authentication SDK". Then the Our backend services will be ready to verify those credentials and return a response to the client. View and Authorize Users In this module, the admin can view the list of users who are all registered.

In this, the admin can view the user's details such as username, email, address, and the admin authorize the users. After a successful check-in, you'll access the user's basic profile information, and you will control the user's access to data stored in other Firebase products. We can also use the given authentication token to validate the identity of users or clients in our backend services.

Firebase Pros &

Cons Advantages:

-

- Email & password authentication
- Realtime data And Ready-made API
- All files are stored in Google Cloud Storage
- It is a Static file hosting
- It Treats data as streams to build highly scalable applications.

Disadvantages: -

- It has a Limited query ability because of Firebase's data stream model
It is a traditional relational data model. So, it does not apply to NoSQL then, your SQL chops will not transfer.

GOOGLE CLOUD PLATFORM

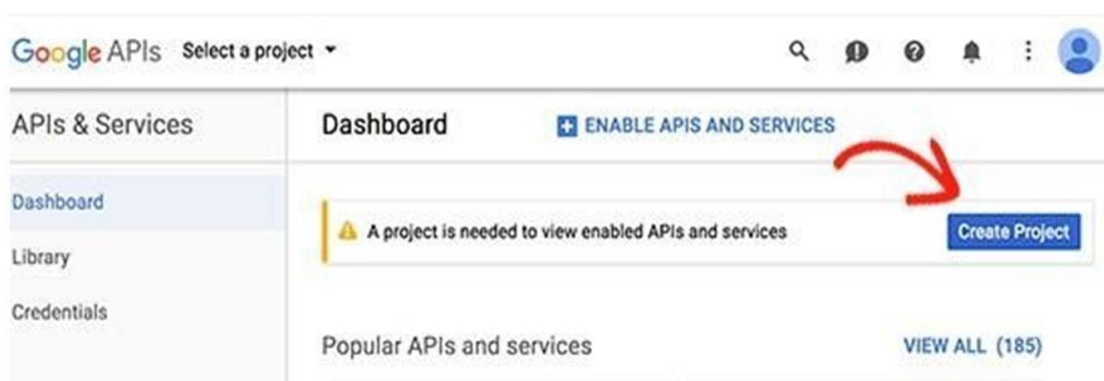
Google Cloud Platform is a Cloud Computing service offered by Google and it also uses GCP for its products like Drive, Gmail, etc. In the project “Cloud Computing based Learning Web Application through Amazon Web Services” we used GCP only for Email API.



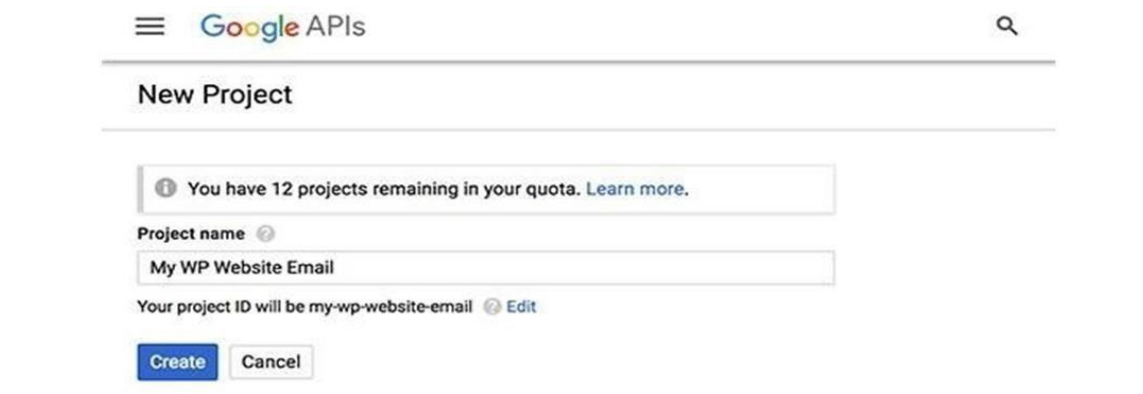
The primary functionalities of Email API in our web application are to send emails to users about their registration, course enrollment, changing the password, generating the certificate, and also any regular updates like adding new courses or changes in any course material. In Email API we use SMTP which is standard among all website users. To create an SMTP server in GCP we can do by following the steps mentioned below:

3.4.1 CREATION OF SMTP SEVER IN GCP

Step1: Open the Google Cloud Platform. In API's and services click on “Create Project”.

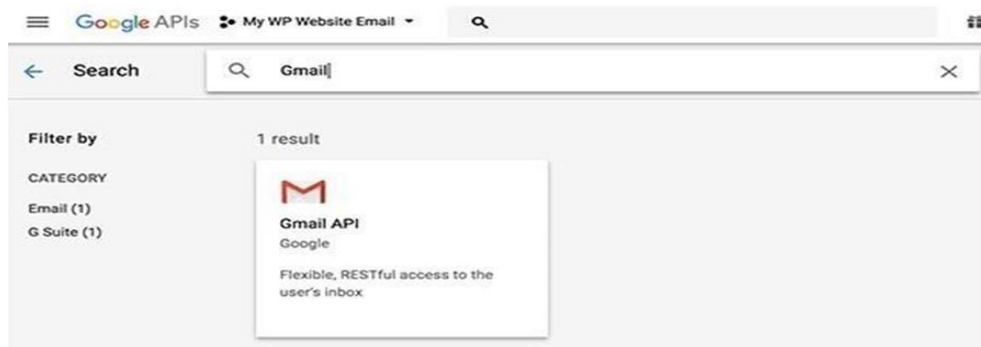


Step2: Give a name and press Create.

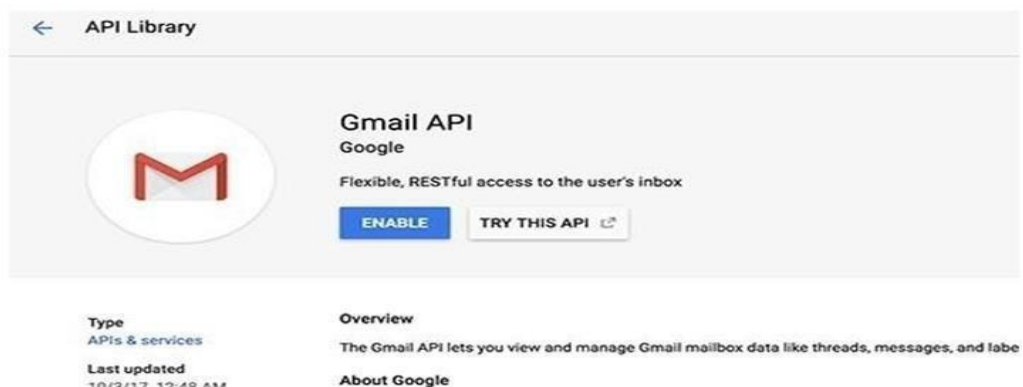


The screenshot shows the 'New Project' page in the Google APIs console. At the top, there's a hamburger menu, the 'Google APIs' logo, and a search icon. Below the header, the title 'New Project' is centered. A message box states: 'You have 12 projects remaining in your quota. [Learn more.](#)'. The 'Project name' field is labeled with a question mark icon and contains the text 'My WP Website Email'. Below this, a message says: 'Your project ID will be my-wp-website-email [Edit](#)'. At the bottom, there are two buttons: 'Create' (in blue) and 'Cancel' (in white).

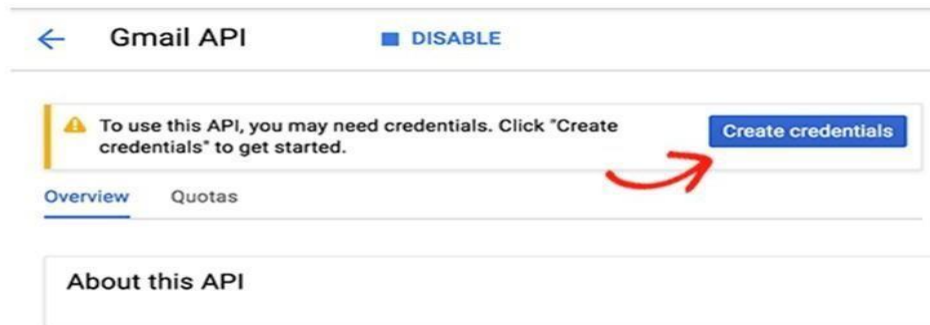
Step3: In the Developer, console enable API's and Services and then you will be moved to the API library page



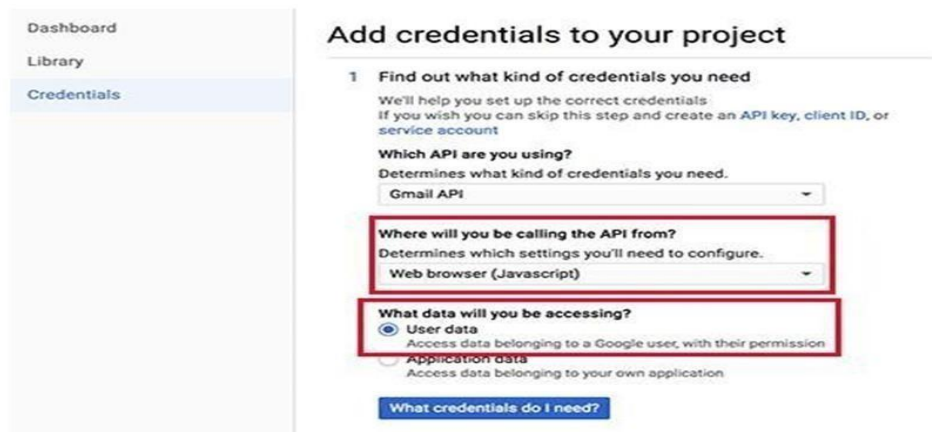
Step4: In the API library click on Enable button. Now the API is enabled.



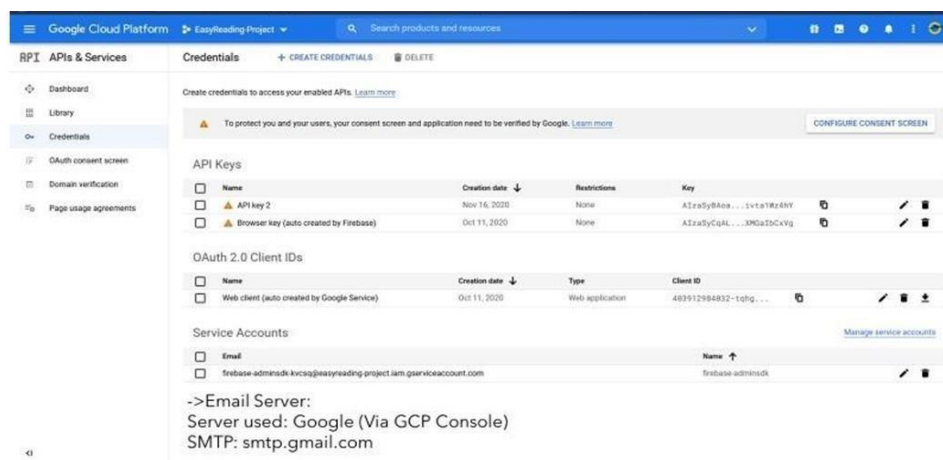
Step5: Create Credentials for the WP Mail SMTP. We need to install the WP Mail SMTP plugin in WordPress to work.



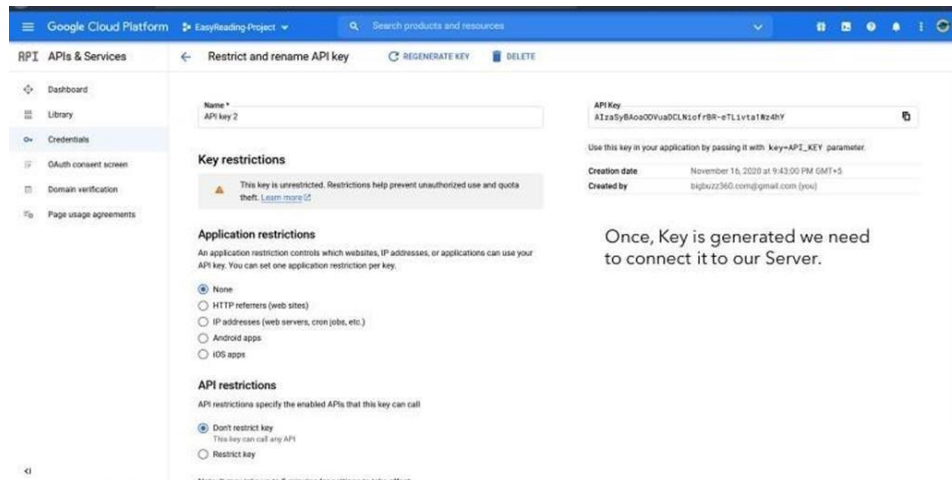
Step6: Select Web Browser JavaScript and then click on the User Data option



Step7: Create a name for the Client OAuth2.0.



Step8: In the final step save all the settings and then you are ready to use the Email API in your Web Application.



AMAZON WEB SERVICES (AWS)

Amazon Web Services (AWS) is the world's most frequently used, extensive, and globally adopted cloud platform, offering over 175 fully-featured services from data centers globally and locally like Amazon RDS, Amazon S3, etc. Millions of customers and users—including the fastest-increasing startups, biggest enterprises, and leading government agencies, are using AWS to lower costs, become more agile, and innovate faster.



Amazon web service is a platform that offers pliable, reliable, scalable, easy-to-use, secured, portable and cost-effective cloud computing solutions. AWS is an extensive, easy-to-use computing platform offered by Amazon.

The platform is developed with a combination of three services as infrastructure as a service (IaaS), platform as a service (PaaS), and packaged software as a service (SaaS) offering.

The following are the Amazon Web Services that are used in our project:

Amazon LightSail; Amazon RDS; Amazon Route53, Identity Access Management.

IMPLEMENTATION OF LIGHTSAIL

AWS LightSail is an easy-to-use service in AWS where a user can maintain a web application and it is easy to access and maintain compared to the EC2 instance and it is very cost-effective compared to the EC2 instance.

In our project, we designed a Web Application using WordPress and it is maintained using AWS LightSail. When compared to an EC2 instance LightSail is mostly used in Custom sites and simple web applications whereas EC2 mostly deals with some math like analytics compared to LightSail where mostly user uses the service for creating some prototypes of web application and it is used for testing purpose. In AWS LightSail user has an option to choose between a Linux or Windows server and the pricing varies from the features the user chooses the pricing depends on various features that can be opted by a user.



The features are:

- Memory – User can choose from 512MB to 32GB
- Processor – User can choose from 1 core to 8 cores
- SSD Disk – User can choose from 20GB to 640GB
- Transfer Speed – User can choose from 1TB to 7TB

The user also has various services in AWS LightSail. We can have a separate Virtual Private Server for a user to access. The Application Programming Interface allows users to develop an application using LightSail and users can also integrate it into external applications. Using LightSail, we can also use other services like Content Delivery Network which helps in transferring files, images, or other types of data securely and without any hassle.

LightSail instance is a VPS that helps to manage the data build web applications. Managing instances is much easier in LightSail we can easily manage all its functionalities in the LightSail console.

There are many application templates available in LightSail. They are:

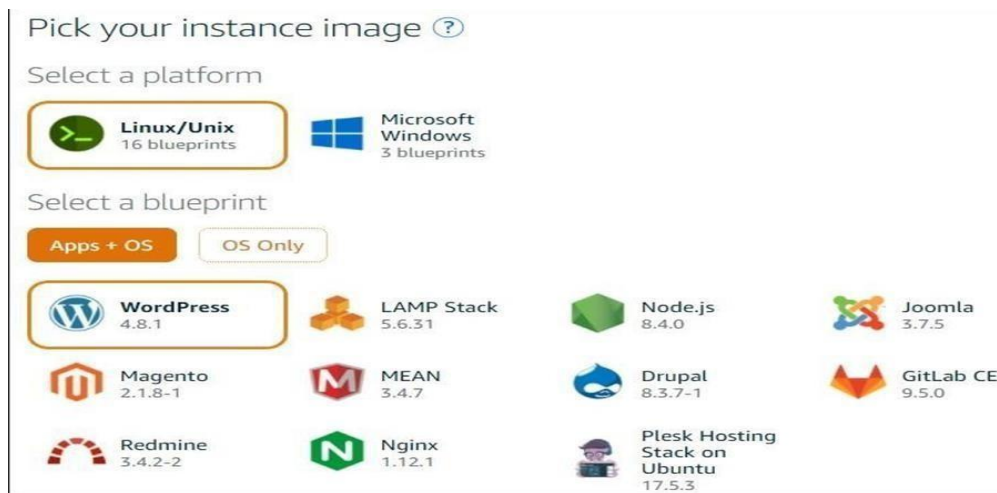
- WordPress
- Drupal
- Joomla!
- MEAN
- Django
- Redmine
- Ghost
- Node.js
- Magento

Selecting a Platform or Operating System and Applications.

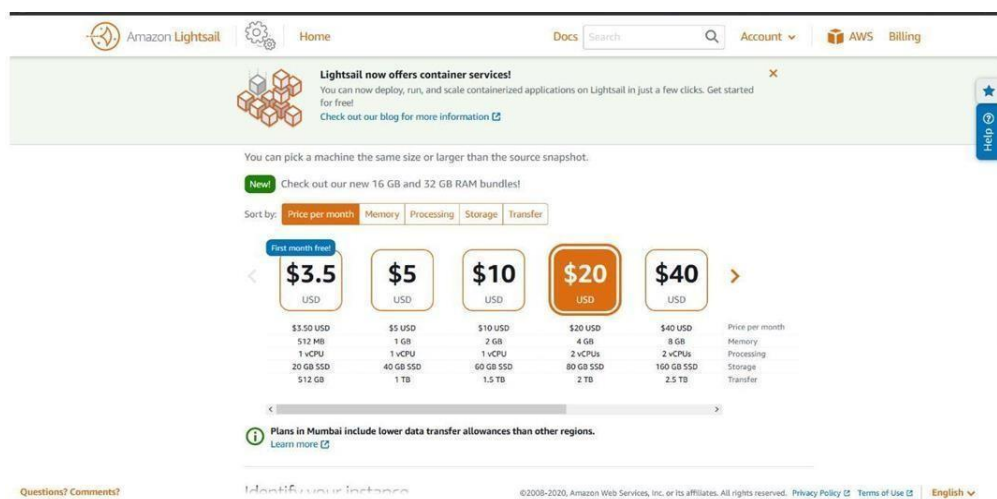
LightSail -> Selected Platform:

Unix/Linux Blueprint: WordPress as

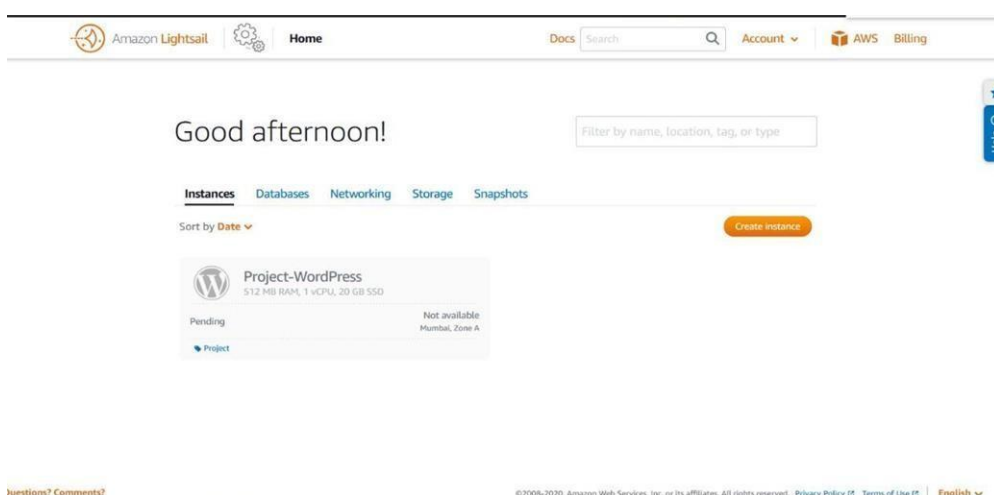
Application +OS



The Instance plan we used is



Now the Instance is ready to use



AMAZON RELATIONAL DATABASE SERVICE (RDS)

Amazon Relational Database Service (AWS RDS) is a database that is a relationally distributed service provided by Amazon Web Services. It is easy to line up, work, and scale a relational database within the cloud. It is a cost-efficient and resizable capacity Service which automates time-consuming administration tasks like database setup, patching, and backups.



Benefits of RDS:

- It is used to managed SQL databases.
- It supports the databases to store and organize data.
- It helps with database management tasks Which are migration, backup, recovery, and patching.

Amazon Route53

Amazon Route53 is a scalable Domain Name System (DNS) or Domain Name Service (DNS) web service. We can use Route53 to perform 3 functions in any combination like domain registration, DNS routing, and health checking.

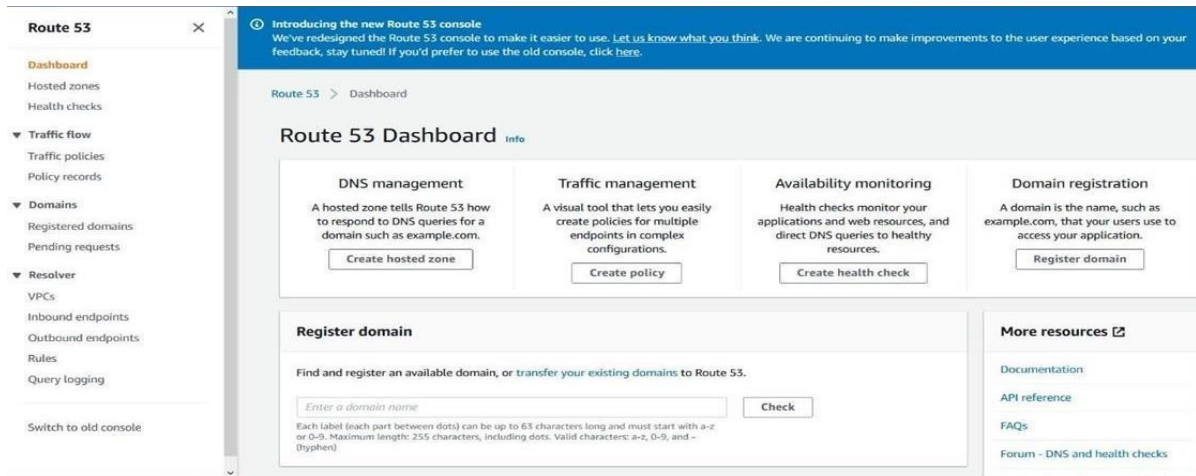
Features:

Register domain names

- We can easily register top level domain names like .com, .net, .org etc.,

Route internet traffic to the resources for your domain

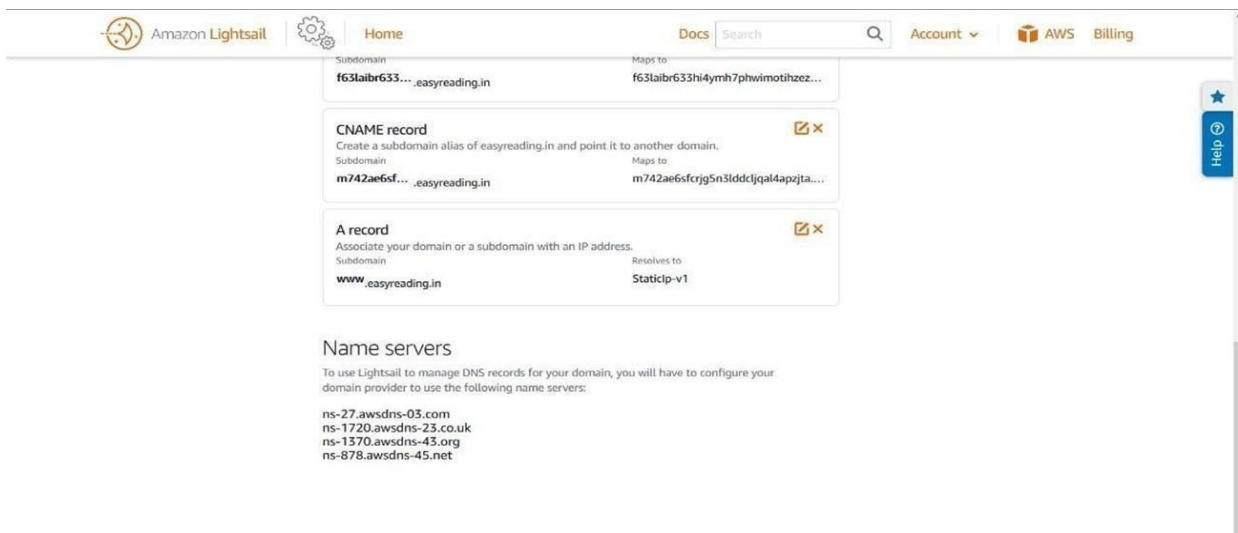
- We can Modify/update the DNS zone according to us



When a user opens a web browser and enters our domain name or subdomain name in the address bar, Route53 helps connect the browser with your website or web application.

The Name servers of our domain names are:

- ***ns-27.awsdns-03.com***
- ***ns-1720.awsdns-23.co.uk***
- ***ns-1370.awsdns-43.org***
- ***ns-878.awsdns-45.net***



To do this we need the AWS Route53 job here, when we navigate to the "Network" tab and select attach a domain, LightSail gives us Nameservers that need to be attached to our domain and get updated in the background. This may take up to 24- 48 hours.

IDENTITY ACCESS MANAGEMENT (IAM)

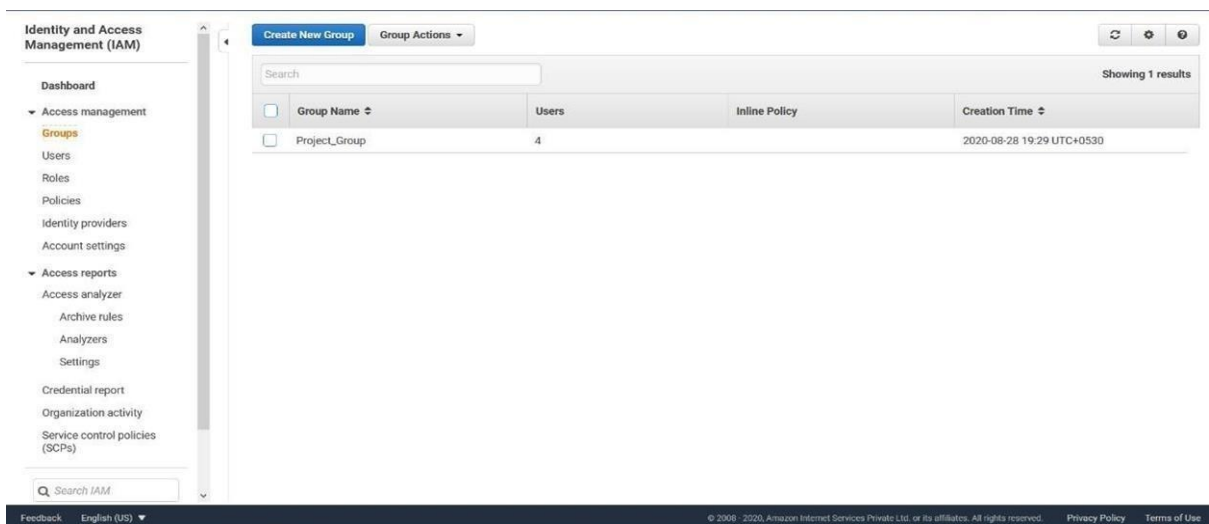
AWS (IAM) is a web service that helps us securely control access to AWS resources. We use IAM to control who is authenticated and authorized to use resources.

When we first create an AWS account, we begin with a single sign-in identity that has complete access to all AWS services and their resources in the account. This is called the AWS account root user and is accessed by signing in with the email address and password that we used to create the account.

IAM features used in our project

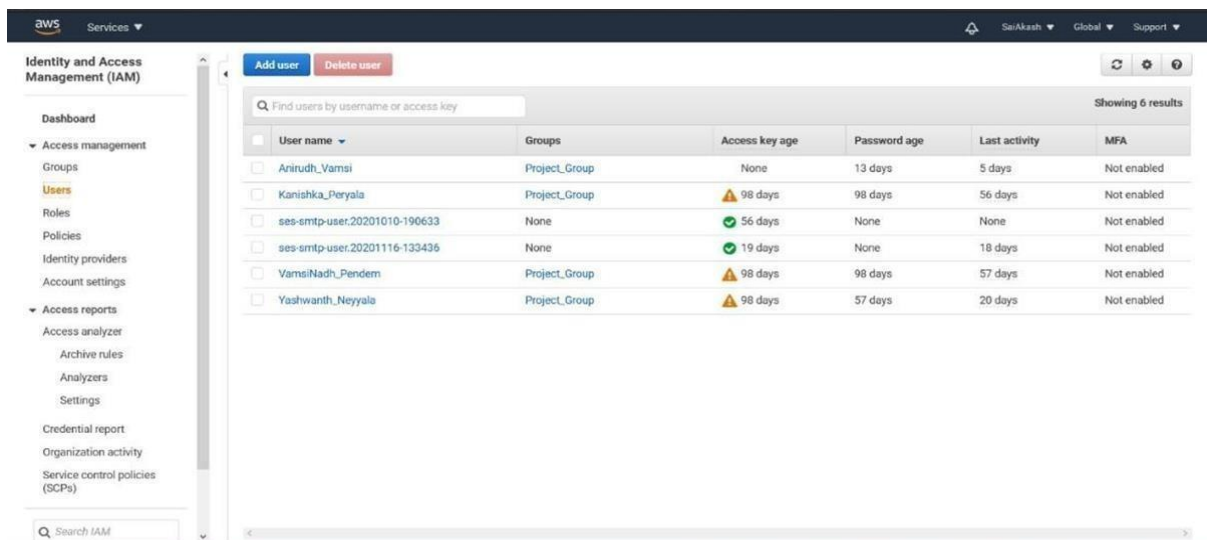
Shared access to your AWS account

- We can create multiple accounts for users and give access to our organization.



Granular permissions

- Role wise permissions to the users.



The screenshot shows the AWS IAM console interface. On the left is a navigation menu with options like Dashboard, Access management, Groups, Users, Roles, Policies, Identity providers, Account settings, Access reports, Access analyzer, Archive rules, Analyzers, Settings, Credential report, Organization activity, and Service control policies (SCPs). The main area displays a table of users with columns for User name, Groups, Access key age, Password age, Last activity, and MFA. There are buttons for 'Add user' and 'Delete user' at the top. A search bar is present above the table.

User name	Groups	Access key age	Password age	Last activity	MFA
Anirudh_Vamsi	Project_Group	None	13 days	5 days	Not enabled
Kanishka_Peryala	Project_Group	98 days	98 days	56 days	Not enabled
ses-smtp-user:20201010-190633	None	56 days	None	None	Not enabled
ses-smtp-user:20201116-133436	None	19 days	None	18 days	Not enabled
VamsiNadh_Pendem	Project_Group	98 days	98 days	57 days	Not enabled
Yashwanth_Neyyala	Project_Group	98 days	57 days	20 days	Not enabled

Multi-factor authentication (MFA)

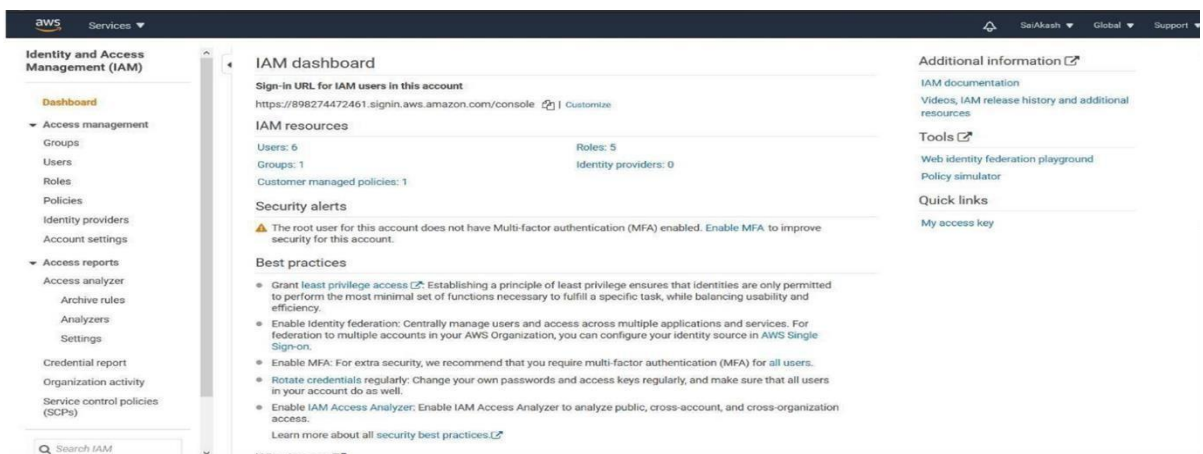
- If a user is interested in enabling extra security to their account, they can use MFA or 2FA authentications.

Integrated with many AWS services

- We can create policies and groups so that It will be easy to categorize the users and assign services.

Free to use: -

- IAM is free to use. AWS does not charge for IAM



The screenshot shows the AWS IAM dashboard. It includes a navigation menu on the left. The main content area is titled 'IAM dashboard' and contains several sections: 'Sign-in URL for IAM users in this account' with a link, 'IAM resources' showing counts for Users (6), Groups (1), Roles (5), and Identity providers (0), 'Customer managed policies: 1', 'Security alerts' with a warning about MFA, and 'Best practices' with a list of recommendations like 'Grant least privilege access', 'Enable Identity federation', 'Enable MFA', 'Rotate credentials regularly', and 'Enable IAM Access Analyzer'. On the right, there are links for 'Additional information', 'Tools', and 'Quick links'.

The above is the figure of AWS IAM Dashboard

SECURING THE WEB APPLICATION USING SSL CERTIFICATE

The SSL certificate is used to secure a website from HTTP to a secured HTTPS. SSL is a protocol for verifying server identity and for encrypting internet traffic. SSL generally contains the following information of a web application.

1. Domain Name
2. Person to whom the certificate was issued.
3. Who issued the SSL Certificate?
4. Certificate Authorities Digital signature
5. Issued Date of the SSL Certificate
6. Expiry Date of the SSL Certificate
7. The public key is also visible to users, but the private key is encrypted and not made available to the users.

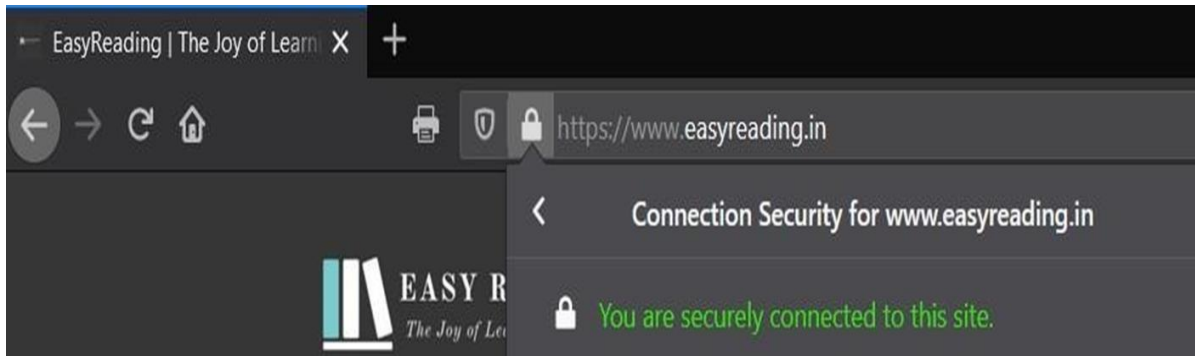
A website needs an SSL Certificate mainly because it assures the user that the web application, they are using is secure and their data is safe. It also allows to authenticate the user and prevent attackers from other organizations from creating a fake or a copied version.

We need to install an SSL certificate manually using the bitnami shell prompt. For this, we use SSL Commands to install on our server/instance.



To get a free SSL Certificate, we can sign up to Cloudflare it is a CDN that provides a free SSL to users. The reason why Cloudflare is offering users free SSL Certificates

is that it is a globally distributed CDN and it also has proxy servers all around the world and the main goal of Cloudflare is to make the Internet more secure that's the reason why Cloudflare is offering free Secure Socket Layer (SSL) Certificates. Once we install the SSL certificate. Our site will be secured i.e.: it transfers from HTTP to HTTPS.



Commands to install SSL certificate:

- `sudo /opt/bitnami/bncert-tool`
- `sudo crontab -e sudo crontab -e -u bitnami`
- `sudo /opt/bitnami/ctlscript.sh start`
- `test ! -f "/opt/bitnami/common/bin/openssl" && echo "Approach A: Using system packages." || echo "Approach B: Self-contained installation."`
- `sudo /opt/bitnami/ctlscript.sh stop`
- `sudo /opt/bitnami/letsencrypt/lego --tls --email="EMAIL-ADDRESS" -- domains="DOMAIN" --domains="www.DOMAIN" --path="/opt/bitnami/letsencrypt" run`
- `sudo /opt/bitnami/ctlscript.sh start`

CHAPTER 4

RESULTS AND DISCUSSION

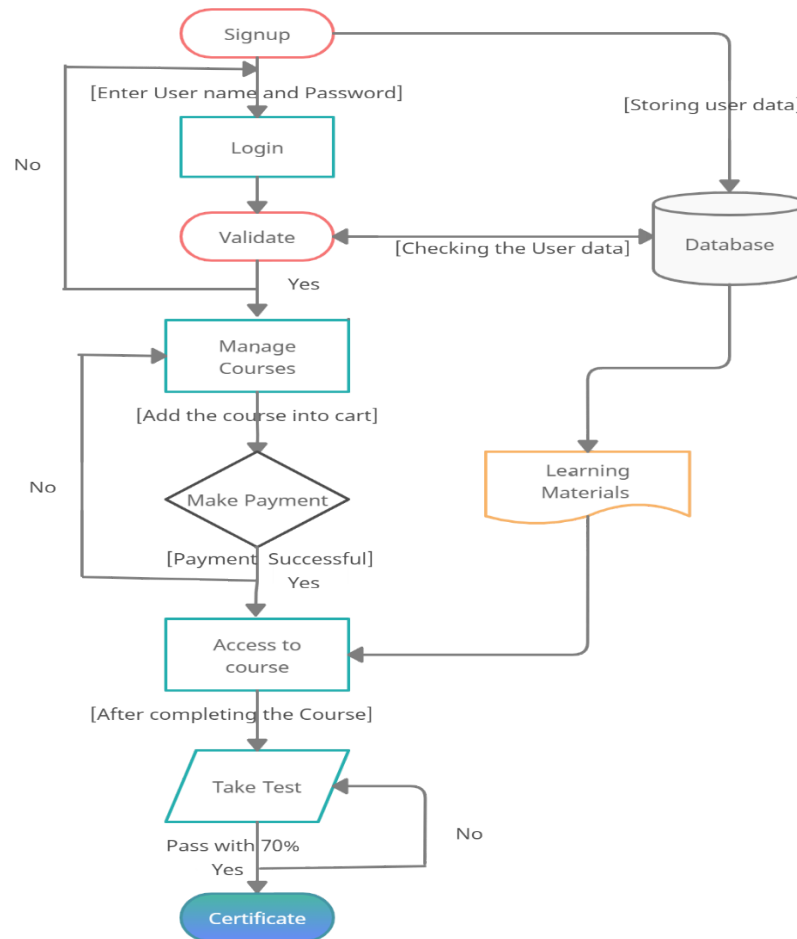


Fig 4.1: Flow Chart

The above flow chart represents that firstly, a user has to Sign up with the username and password and if the user is already registered then they can log in. once you submit your details it will store them in the database. If you are an existing user then the details will be validated and if the details provided by you are correct then you can move further. Further user can view all the courses which are available and select one of their choices and continue for payment. If payment is successful then you can access the course and if payment is not successful user needs to check it and pay then only the course will be unlocked. After completing all the modules in the course then the user has to take up a quiz if they pass with 70%, they will receive a certificate of completion and if they fail then they have to

take up the quiz again.

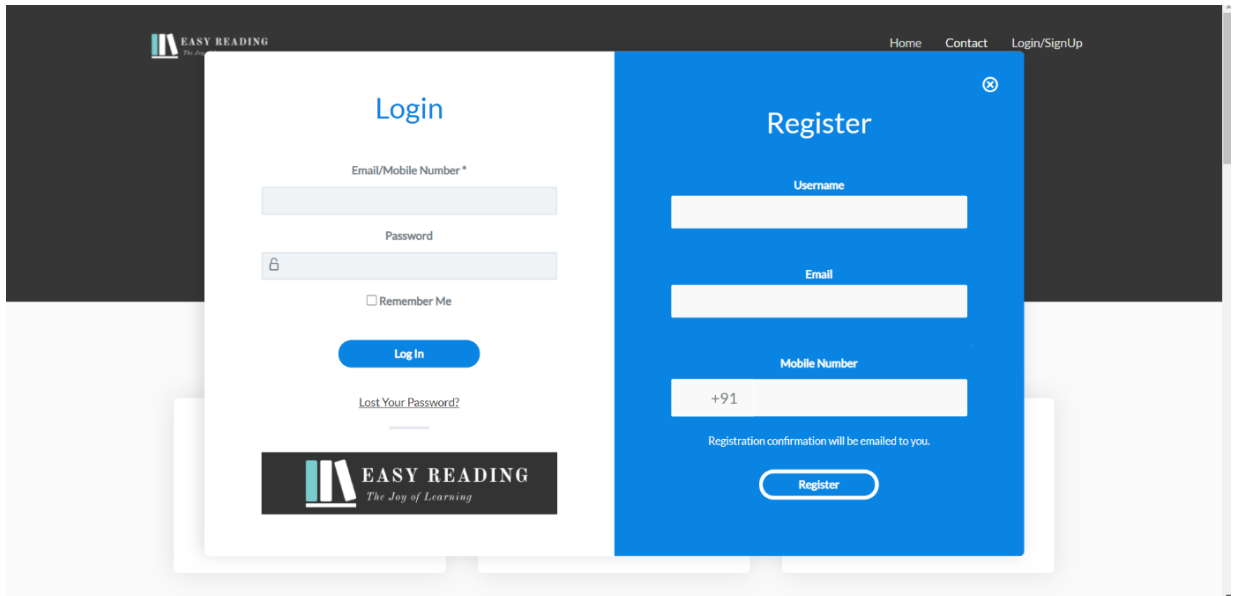


Fig 4.2: Login/Signup page

Fig. represents the Login/Signup page where the users can create their new account or if they are having an existing account, they can log in from this page.

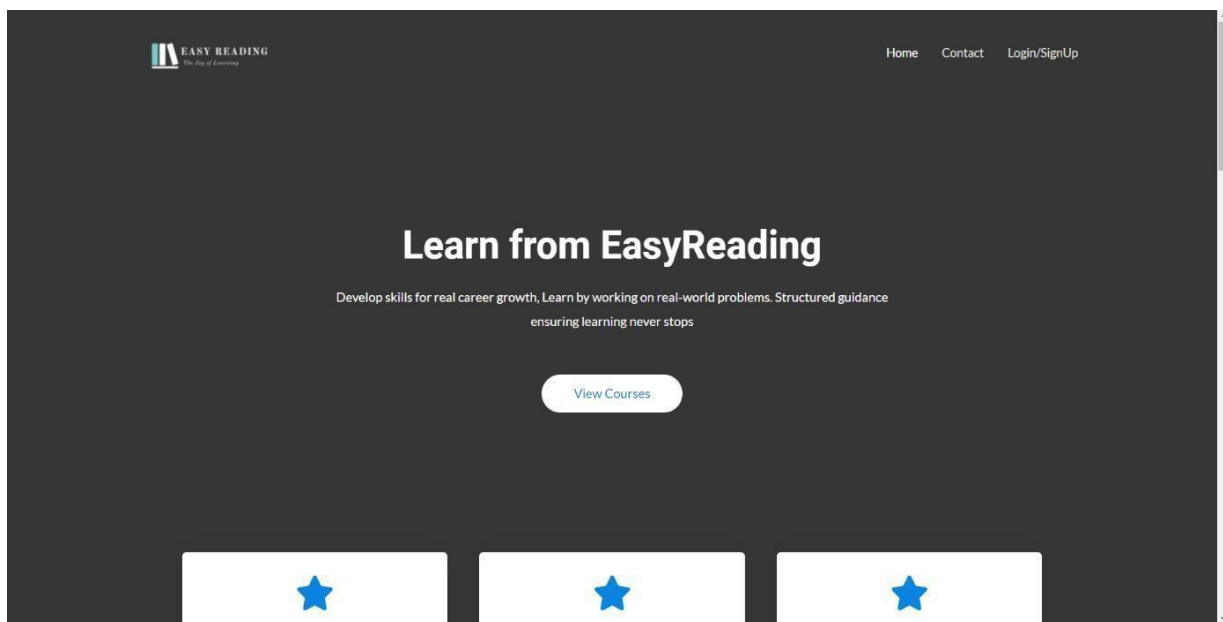


Fig 4.3: Homepage

Fig represents the home page where the user can view all the available content at this homepage, from the homepage user can access any other page.

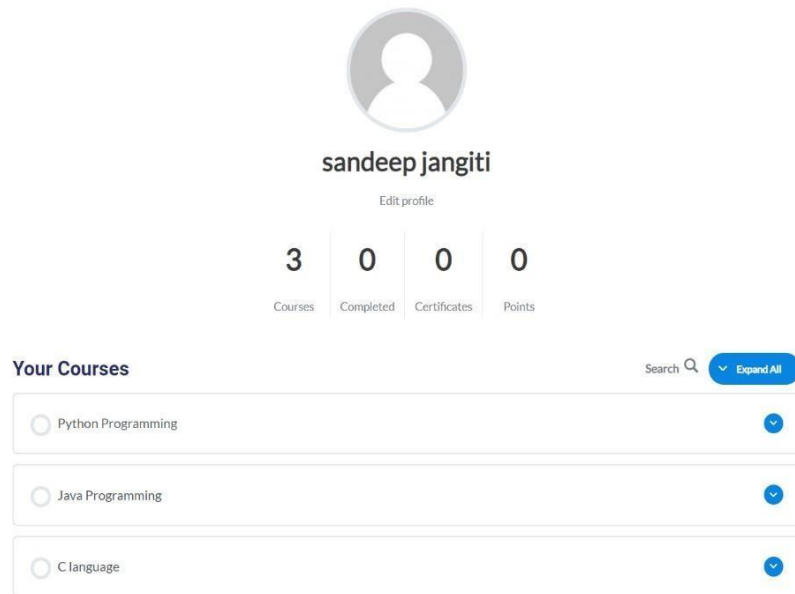


Fig 4.4: Dashboard

Fig represents the user's dashboard where the users can view all their stats like how many courses they completed and certificates can be download from the dashboard. Users can also see how much you have progressed in each course.

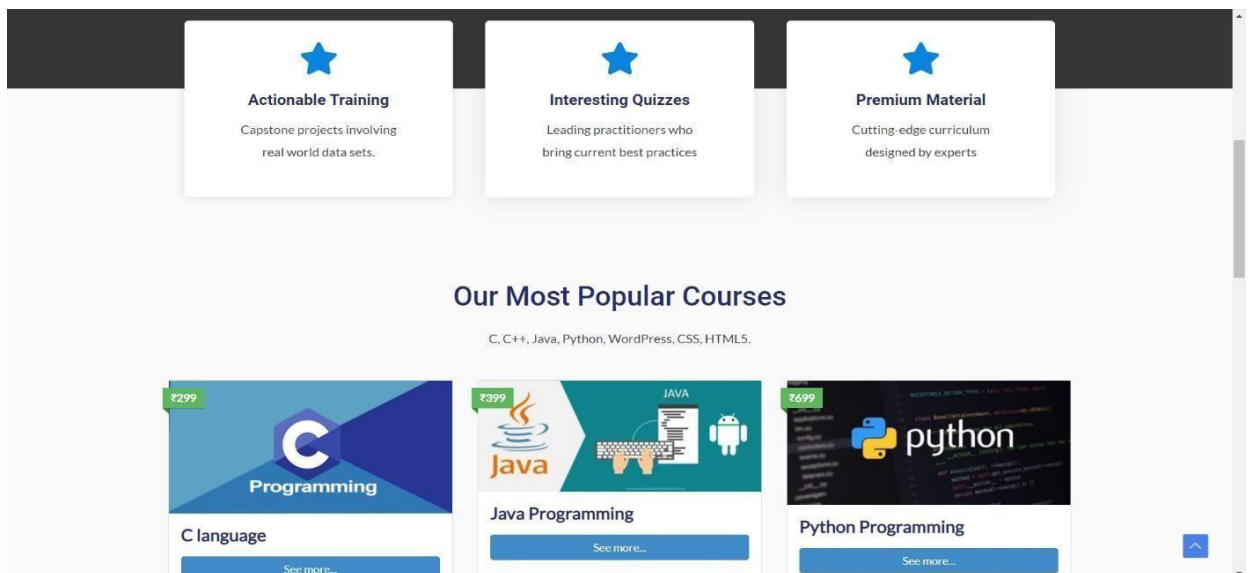


Fig 4.5: Course Enrolling Page

Fig represents the users after creating the account next step is to enroll in the course which they want to do. To enroll the course users, need to pay the respective amount then it will automatically unlock.

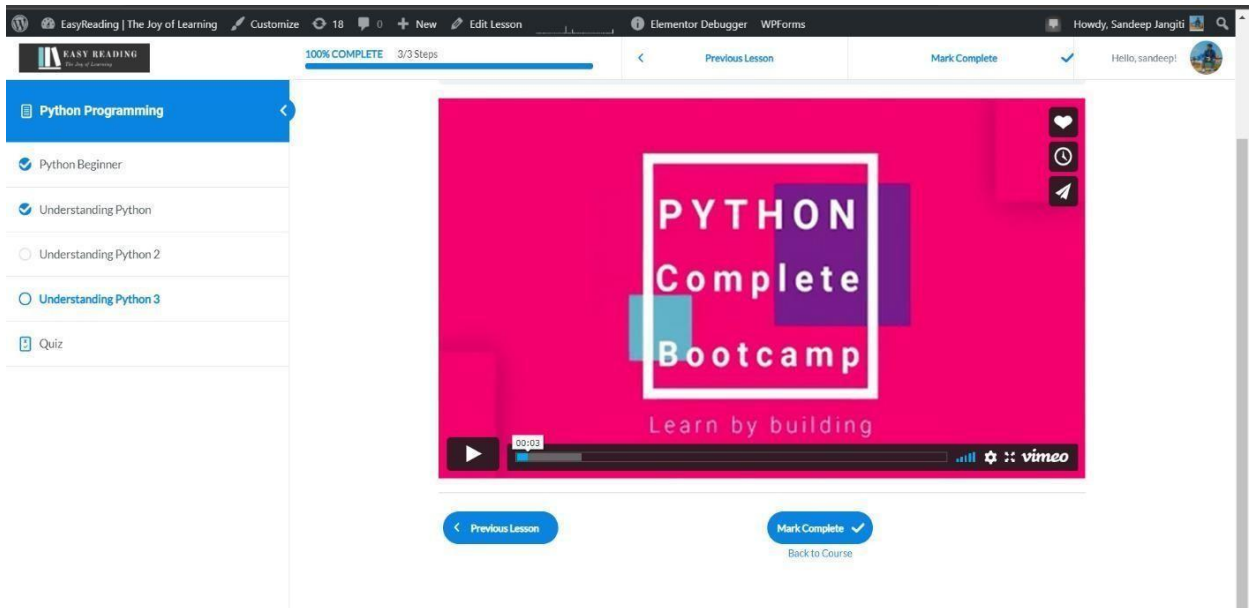


Fig 4.6: Course Videos.

Fig represents the course videos in which users have enrolled. So, every course consists of both text and video format so that it helps the users for better understanding.

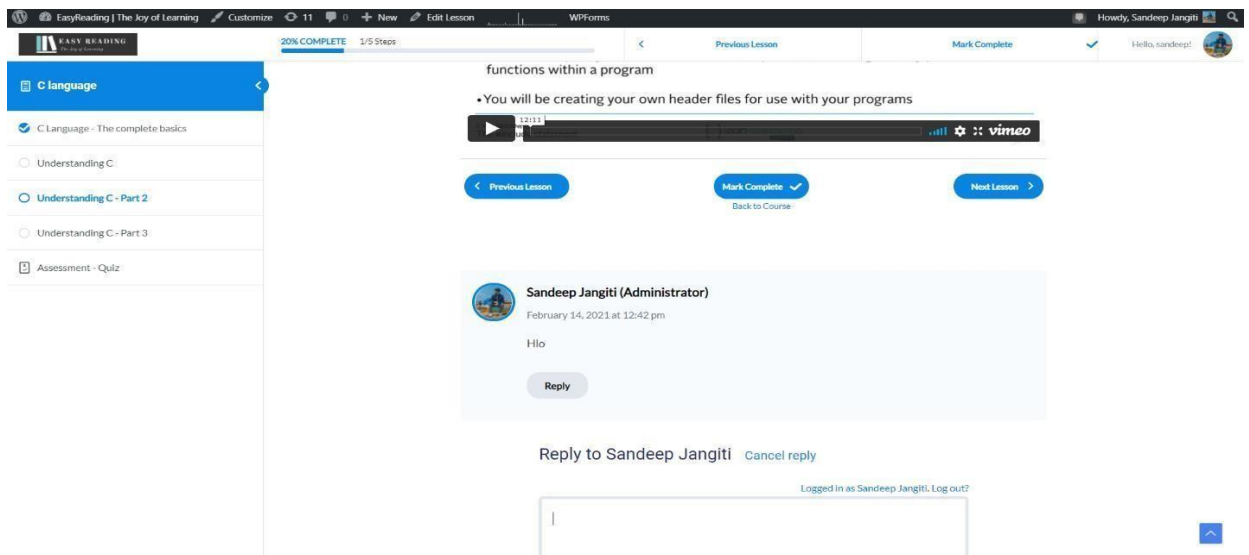


Fig 4.7 Comment Section

Fig represents if the user has any doubts, they can post it in the comment section below the video so if any other user knows the solution, he can answer it there.

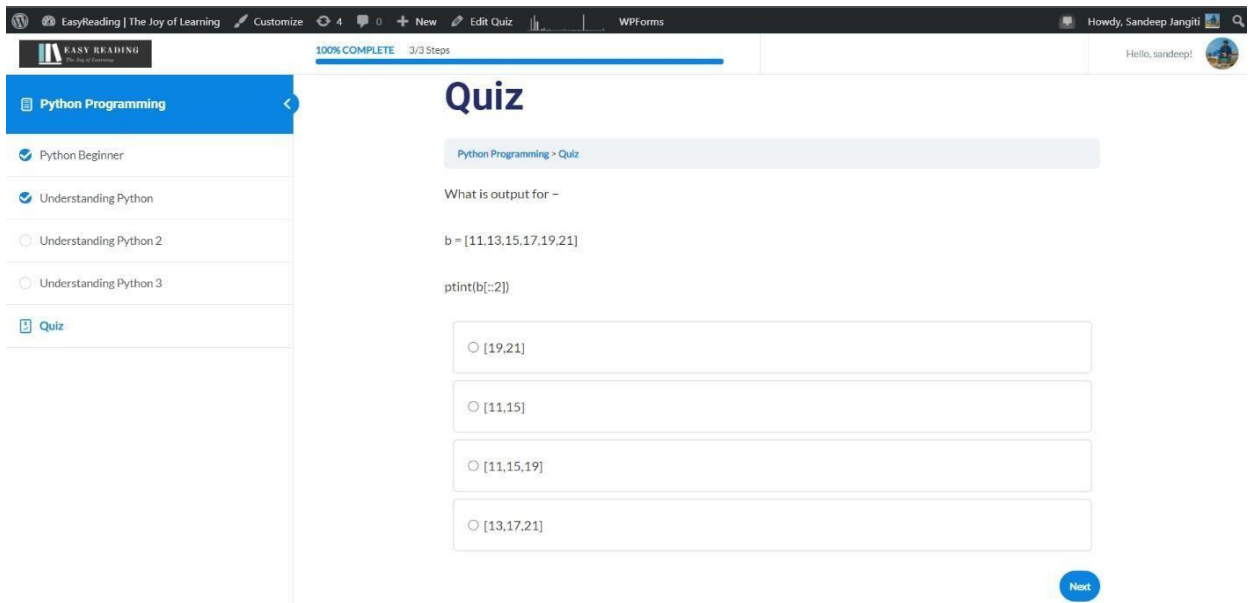


Fig 4.8: Quiz

Fig represents the quiz a user is going to take after completing the course. The user needs to attempt all the questions provided.



Fig 4.9: Certificate of Completion

Once the user completes the course, he has to take up a quiz. If the user scored 70% or above, they will be granted a certificate of completion. If they fail to get 70% then they should attempt the quiz once again.

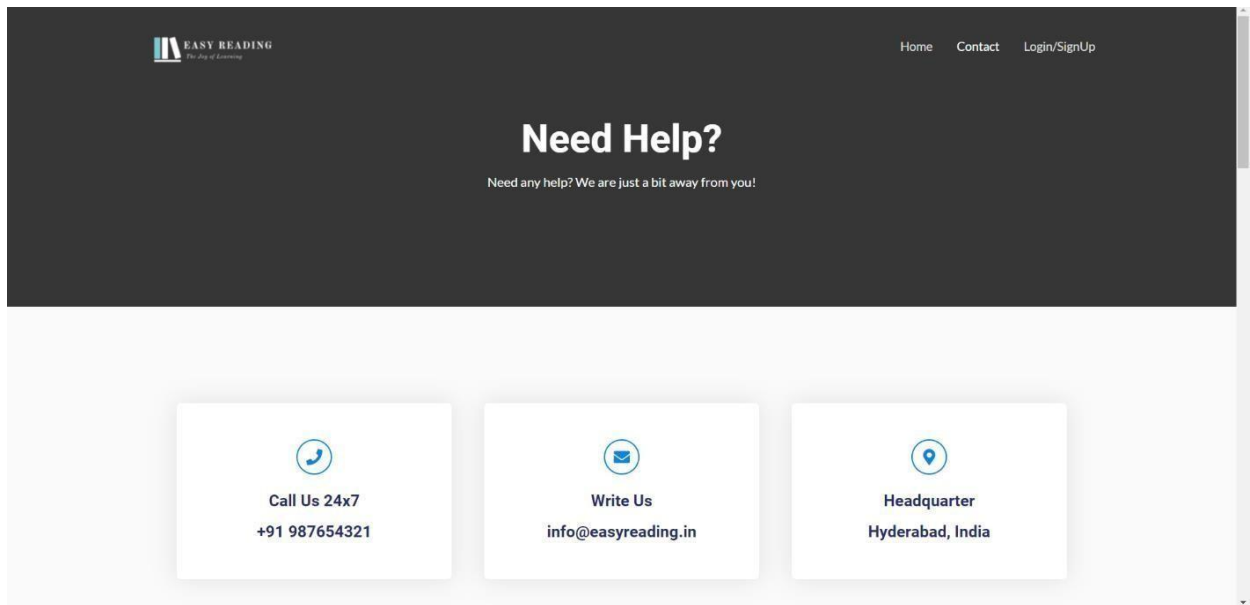


Fig 4.10 Contact Page

If the users are having any complaints regarding courses or any updates or any payment issue, they can contact the admin with the given contact information and can solve their issues by reaching them.

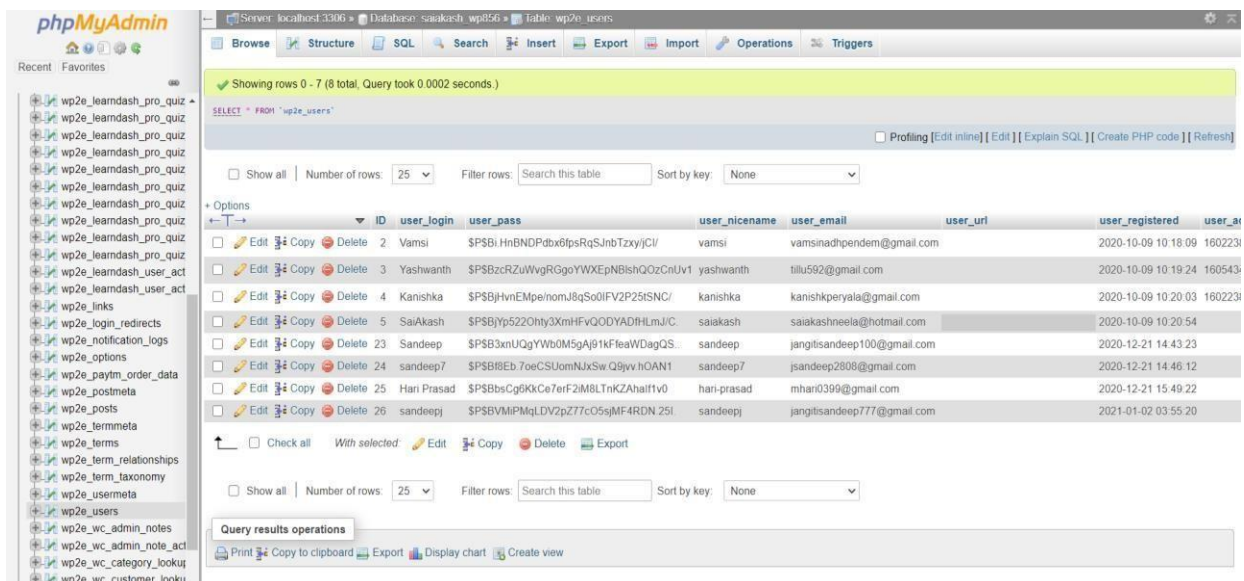


Fig 4.11: Database

This the main part of the project every data is stored in the database like user details, order details, payment details, and many more. This database can be accessed only by the admin users who cannot get access to the database.

CHAPTER 5

CONCLUSION AND FUTURE WORK

CONCLUSION

Cloud computing-based E- learning web application system is the latest generation of traditional e-learning. Cloud computing services support the ability to allocate computing and storage as an appropriate platform to improve the form of e-learning. This e-learning web application system allows to exchange of the form of education content and integrate new learning methods. Mainly to reduce costs and maintenance training will also help. This e-learning application based on the cloud is created for mass data storage, high-speed computing capabilities, and its ideal allocation and sharing mode of resources. These days cloud computing has become increasingly widespread, this e-learning will also certainly used in a new era of cloud computing.

Cloud services are rising rapidly that makes the changes in information technology. These Cloud services are now available for all students and teachers. By using cloud computing they can access anywhere, anytime, and on any device. Some universities have started the initiative that indicates a significant decrease in expenses due to implementation of the cloud solutions.

FUTURE WORK

In the future, we are going to add more courses like animation, VFX, etc. And upgrade the page to work faster and also, we will expand the database storage capacity. The main feature we are going to implement is live coaching i.e., live interaction between teacher and User.

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APPENDIX

A. PLAGIARISM REPORT



Document Information

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B. PAPER

CLOUD COMPUTING BASED E-LEARNING WEB APPLICATION SYSTEM

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Abstract: In this Web Application, we are going to create an e-Learning web application using WordPress using Cloud Services. The project mainly consists of Amazon Cloud Services, Google Firebase, and Google Cloud Platform. Our aim of this project is to provide Courses online for Students. These services are used in many fields because of advantages providing by the cloud so that it will be more useful for the educational institutions like reducing the cost of the infrastructure and many more. The advantages of using cloud are it is very easy to implement, and we can manage it easily. When any sensitive data has been lost the cloud offers good security for it, we can back up easily. At present situations e-learning platform getting good impact why because these e-learning platforms doesn't require any hardware or software to run it only requires the internet and browser to run. Some educational institutions cannot afford so much investment, so for them, cloud computing is the best option.

INDEX TERMS: E-Learning, WordPress, Google Firebase, Cloud-Based Training, Web-based Training.

1. Introduction

E-learning, the word itself tells us the meaning. In this modern world, it is easy to communicate with each other and [18] do a lot of things. Technology helps us in every aspect. Learning virtually and interacting with others and [22] sharing knowledge mutually in a medium is called E-Learning. In this twenty-first century, E-Learning has become such a huge demand that almost everyone is willing to try and gain knowledge from these platforms. There are many advantages through E-Learning, one can ask or share their questions or answers with just a single click. E-Learning is open to everyone willing to learn and gain knowledge. E-Learning has advanced tools and features where one can understand easily. One can gain practical knowledge and improve or make their skills stronger. E-Learning platforms are hosted on the [23] cloud so that anyone [23] can access their dashboard from anywhere by just having a good internet connection.

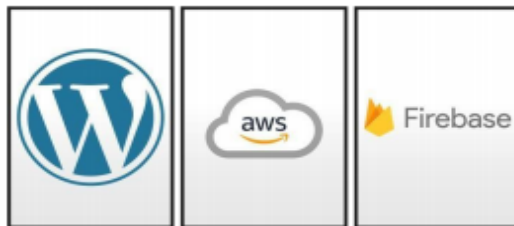


Fig1: Services Used In Our Website.

2. Cloud Computing

Cloud computing is a term referred for storing and accessing data over the internet [19] globally. It does not store any data on the [20] hard disk of your [15] personal computer in this data center used for storing purposes. In cloud computing, you can access data from [21] a remote server which is easier for retrieving the data.

Cloud computing is a good option for those people who does business for several reasons like cost savings, speed and ~~any~~ performance, and security etc..

3. Google Firebase

Firebase is a platform developed by Google which is used to create mobile and web applications. It is one of [14] Google's backend application development software that enables developers or anyone who is just trying or checking it out to develop Web Applications, iOS Applications, and Android Applications. Google Firebase provides many sets of tools and features for reporting or providing application bugs or errors and fixing application errors, Authentication, product experiment, and tracking analytics.

We have used Google Firebase in our Project to Authenticate the Users of our web application.

4. WordPress

WordPress is a web or online publishing software or service you can use to create and design your website or web application or blog. Back it was released in 2003[16], WordPress has become one of the most[27] popular web publishing software service platforms. More than 50% of entire websites in the world are designed and[27] 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 internetconnection and without having to learn or write a single line of code.

5. Amazon Web Services (AWS)

Amazon Web Services (AWS)[17] is the most often used, extensive also globally adopted and used cloud platform, offering many fully-featured services from data[28] centers globally and locally like Amazon Services. Numerous customers and users including startups, the 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[24] numerous services that are fast, reliable, cost-effective, and easy to use.

Amazon Web Service is a[29] cloud service provider offered by Amazon. AWS is a combination of three services as Infrastructure as a Service (IaaS), Platform as a Service[24] (PaaS), and Software as a Service (SaaS)[24] offering.

AWS LightSail

The LightSail is one of the newest services that is offered by AWS and follows the Pay as you go, model.



Fig2: Amazon LightSail

AWS LightSail is an easy-to-use service in the AWS whereas a user can maintain a web application and it is easy to access and maintain compared to the EC2 instance and it is very cost-effective compared to the EC2 instance. In this project, we designed Web Application using WordPress and it is maintained using AWS LightSail. When compared to EC2 instance LightSail is mostly used in Custom sites and simple web applications where EC2 deals with math analytics compared to LightSail where mostly user uses the service for creating some prototypes of web applications and it[24] is used for testing purposes. In AWS LightSail user has an option to choose between a Linux or Windows server and the pricing varies from the features the user chooses. We can have a separate Virtual[23] Private Server for a user to access. The Application Programming Interface allows[25] used to develop an application using LightSail and users can also integrate it into external applications. Using LightSail, we can also use other services like Content Delivery Network which[26] helps in transferring files, images, or other types of data securely and without any hassle. LightSail instance is a VPS that helps to manage the data build web applications. Managing instances is much easier in LightSail we can easily manage all its functionalities in LightSail.

There are many application templates available in LightSail.

Selected Plan in LightSail:

Virtual Private Server Specifications



Fig3: Virtual private Server Specifications

Amazon RDS



Fig4: Amazon RDS

Amazon Relational Database Service (AWS RDS) is a database that is a relationally distributed service provided by Amazon Web Services. It is easy to line up, work, and scale a relational database within the cloud.

It is a cost-efficient and resizable capacity Service which automates time-consuming administration tasks like database setup, patching, and backups.

Benefits of RDS: It is used to managed SQL databases. It supports the databases to store and organize data.

It helps with database management tasks Which are like migration, backup, recovery, and patching

6. Google Cloud Platform (GCP)



Fig5: GCP

GCP is a Cloud Computing service offered by Google and it also uses GCP for its products like Drive, Gmail, etc. In the project "Cloud Computing based Learning Web Application through Amazon Web Services" we used GCP only for Email API. The primary functionalities of Email API in our web application are to send emails to users about their registration, course enrollment, changing the password, generating the certificate, and also any regular updates like adding new courses or changes in any course material. In Email API we use SMTP which is standard among all website users

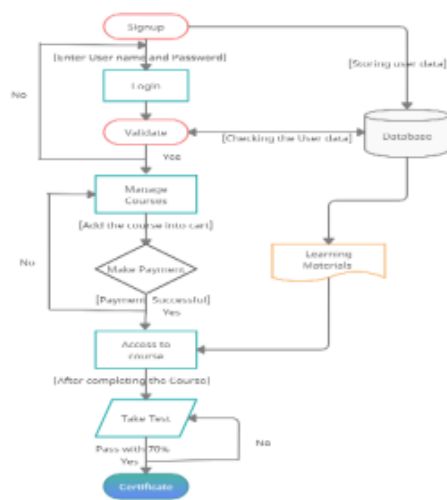


Fig6: Flow Chart

7. PROPOSED SYSTEM

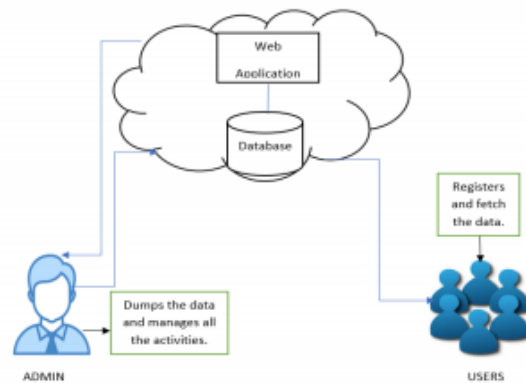


Fig7: Architecture of Our Proposed System

The architecture represents the flow of this application. In this project there will be admin and user, the work of admin is to manage the web application by adding the data checking whether everything working fine or not, and admin have access to control all the activities in this application. When comes to user first thing user to do is create an account in the application and then he can fetch the data added by the admin. This application is hosted in the cloud server using AWS. Adding and fetching the information of the application by the admin and user is done by using MySQL. This system provides proper security and reduces manual work.

8. IMPLEMENTATION

Login to the webpage	Details	Application
• In order to enter to the web application user logs in	• User Enters Details	• Can Access modulus once logged in

The implementation deals with the tools that we have used to design our webpage and also the methods how we have implemented for connecting the back-end servers. We used WordPress to create our front-end page. The other tools which we have used are Google Cloud Platform, Amazon Web Services, Google Firebase, Cloudflare, Adobe Photoshop. We used WordPress because it doesn't require any coding and it saves a lot of time WordPress provides different types of plugins to make the work easier. We used GCP for email API purposes in that we used SMTP which is the standard one among all. We used Google firebase for authentication purposes like authenticating and validating the user's mobile number while creating their account finally to secure our website we get the SSL certificate from Cloudflare.

RELATED WORKS:

The person named Wood presented an introduction to the mobile learning. This describes the mobile technology available today, E-learning in the Nigerian university education based on the experience of the developed countries like the UK, Australia, Korea, and France. Paper pointed out that the challenges of the Nigerian university education to reduce it to a minimum, the federal government should also improve funding on education on the name of UNESCO it recommended 26% of the budget annually. Two persons Traxler and Dearden presented the potential for using the SMS to support learning and organization in sub-Saharan Africa. This describes the work currently underway to support in-service training nationally with a distance learning program this is specifically developed locally to meet the infrastructure and organization requirement of the environment dramatically different from most of the mobile-learning projects.



Fig10: Course Videos

After he/she completes all the modules, the user will be given access to a Quiz, where he/she needs to attempt and pass the quiz for getting their certificate. Minimum 75% is required to pass. After the user successfully passed the exam a certificate will be generated after some time. Users can view his/her certificate and can add to their account.

OUTCOMES FROM PROPOSED SYSTEM



Fig8: Login & Registration Page



Fig9: Course Page

CONCLUSION

Cloud computing-based E-learning web application system is the latest generation of traditional e-learning. Cloud computing services support the ability to allocate computing and storage as an appropriate platform to improve the form of e-learning. This e-learning web application system allows to exchange of the form of education content and integrate new learning methods. Mainly to reduce costs and maintenance training will also help. This e-learning application based on the cloud is created for mass data storage, high-speed computing capabilities, and its ideal allocation and sharing mode of resources. These days cloud computing has become increasingly widespread, this e-learning will also certainly used in a new era of cloud computing. Cloud services are rising rapidly that makes the changes in information technology. These Cloud services are now available for all the students and teachers. By using cloud computing they can access anywhere, anytime, and on any device. Some universities have started the initiative that indicates a significant decrease in expenses due to implementation of the cloud solutions. The main aim of our work is to create a good learning platform for students with low-cost courses.

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- [20] <https://proprivacy.com>
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- [24] <https://uccmilescty.org>
- [25] <https://en.wikipedia.org>
- [26] RVIM COLLEGE, Bangalore University
By 171GCMD157 - 2018, MRSA
- [27] <https://www.khd.com>
- [28] <https://go.qlik.com>
- [29] <https://www.guru99.com>

C. Source Code

```
<?php
/**
 * Dashboard Administration Screen
 *
 * @package WordPress
 * @subpackage Administration
 */

/** Load WordPress Bootstrap */
require_once __DIR__ .
'/admin.php';

/** Load WordPress dashboard API */
require_once ABSPATH .

'wp-admin/includes/dashboard.php';

wp_dashboard_setup();

wp_enqueue_script( 'dashboard' );

if ( current_user_can( 'install_plugins' ) )
    { wp_enqueue_script(
      'plugin-install' );
      wp_enqueue_script( 'updates' );
    }
if ( current_user_can( 'upload_files' ) ) {
    wp_enqueue_script(
      'media-upload' );
}
add_thickbox();

if ( wp_is_mobile() ) {
    wp_enqueue_script( 'jquery-touch-punch' );
}

$title = __( 'Dashboard' );
$parent_file = 'index.php';

$help = '<p>'. __( 'Welcome to your WordPress Dashboard! This is the screen you will
see when you log in to your site, and gives you access to all the site management
features of WordPress. You can get help for any screen by clicking the Help tab above the
screen title.'
) . '</p>';

$screen = get_current_screen();

$screen->add_help_tab(
    array(
        'id' => 'overview',
        'title' => __(
            'Overview' ), 'content'
            => $help,
    )
);

// Help tabs.
```

```
$help = '<p>' . __( 'The left-hand navigation menu provides links to all of the WordPress  
administration screens, with submenu items displayed on hover. You can minimize this  
menu to a narrow icon strip by clicking on the Collapse Menu arrow at the bottom.' ) .  
'</p>';
```

```
$help .= '<p>' . __( 'Links in the Toolbar at the top of the screen connect your dashboard and the front end of your site, and provide access to your profile and helpful WordPress information.' ) . '</p>';
```

```
$screen->add_help_tab(
    array(
        'id' =>
            'help-navigation', 'title'
            => __( 'Navigation' ),
        'content' => $help,
    )
);
```

```
$help = '<p>' . __( 'You can use the following controls to arrange your Dashboard screen to suit your workflow. This is true on most other administration screens as well.' ) . '</p>';
```

```
$help .= '<p>' . __( '<strong>Screen Options</strong> &mdash; Use the Screen Options tab to choose which Dashboard boxes to show.' ) . '</p>';
```

```
$help .= '<p>' . __( '<strong>Drag and Drop</strong> &mdash; To rearrange the boxes, drag and drop by clicking on the title bar of the selected box and releasing when you see a gray dotted-line rectangle appear in the location you want to place the box.' ) . '</p>';
```

```
$help .= '<p>' . __( '<strong>Box Controls</strong> &mdash; Click the title bar of the box to expand or collapse it. Some boxes added by plugins may have configurable content, and will show a &#8220;Configure&#8221; link in the title bar if you hover over it.' ) . '</p>';
```

```
$screen->add_help_tab(
    array(
        'id' =>
            'help-layout', 'title'
            => __( 'Layout' ),
        'content' => $help,
    )
);
```

```
$help = '<p>' . __( 'The boxes on your Dashboard screen are:' ) . '</p>';
```

```
if ( current_user_can( 'edit_theme_options' ) ) {
    $help .= '<p>' . __( '<strong>Welcome</strong> &mdash; Shows links for some of the most common tasks when setting up a new site.' ) . '</p>';
}
```

```
if ( current_user_can( 'view_site_health_checks' ) ) {
    $help .= '<p>' . __( '<strong>Site Health Status</strong> &mdash; Informs you of any potential issues that should be addressed to improve the performance or security of your website.' ) . '</p>';
}
```

```
if ( current_user_can( 'edit_posts' ) ) {
    $help .= '<p>' . __( '<strong>At a Glance</strong> &mdash; Displays a summary of the content on your site and identifies which theme and version of WordPress you are using.' ) . '</p>';
}
```

```
$help .= '<p>' . __( '<strong>Activity</strong> &mdash; Shows the upcoming scheduled posts, recently published posts, and the most recent comments on your posts and allows you to moderate them.' ) . '</p>';
```

```
if ( is_blog_admin() && current_user_can( 'edit_posts' ) ) {
```

\$help .= '<p>' . __("Quick Draft — Allows you to create a new post and save it as a draft. Also displays links to the 3 most recent draft posts you've

```

started." ) . '</p>';
}

$help .= '<p>' . sprintf(
    /* translators: %s: WordPress Planet URL. */
    __( '<strong>WordPress Events and News</strong> &mdash; Upcoming
events near you as well as the latest news from the official WordPress project and
the <a href="%s">WordPress Planet</a>.' ),
    __( 'https://planet.wordpress.org/' )
) . '</p>';

$screen->add_help_tab(
    array(
        'id' =>
        'help-content', 'title'
        =>__( 'Content' ),
        'content' => $help,
    )
);

unset( $help );

$screen->set_help_sidebar(
    '<p><strong>' . __( 'For more information:' ) . '</strong></p>' .
    '<p>' . __( '<a
href="https://wordpress.org/support/article/dashboard-
screen/">Documentation on Dashboard</a>' ) . '</p>' .
    '<p>' . __( '<a href="https://wordpress.org/support/">Support</a>' ) . '</p>'
);

require_once ABSPATH . 'wp-admin/admin-header.php';
?>

<div class="wrap">
    <h1><?php echo esc_html( $title ); ?></h1>

    <?php
    if ( ! empty( $_GET['admin_email_remind_later'] ) ) :
        /** This filter is documented in wp-login.php */
        $remind_interval = (int) apply_filters(
'admin_email_remind_interval', 3 * DAY_IN_SECONDS );
        $postponed_time = get_option( 'admin_email_lifespan' );

        /*
         * Calculate how many seconds it's been since the reminder was
         postponed.
         * This allows us to not show it if the query arg is set, but
         visited due to caches, bookmarks or similar.
         */
        $time_passed = time() - ( $postponed_time - $remind_interval );

        // Only show the dashboard notice if it's been less than a minute since
        the message was postponed.
        if ( $time_passed < MINUTE_IN_SECONDS ) :
            ?>
            <div class="notice notice-success is-dismissible">
                <p>

                <?
                ph

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```

```
/* translators: %s: Human-readable time  
interval. */
```

```

( 'The admin email verification page will reappear after %s.' ),
    human_time_diff( time() + $remind_interval )
    );
    ?>

    </p>
</div>
<?php endif; ?>
<?php endif; ?>

<?php
if ( has_action( 'welcome_panel' ) && current_user_can( 'edit_theme_options' ) ) :
    $classes = 'welcome-panel';

    $option = (int) get_user_meta( get_current_user_id(), 'show_welcome_panel', true
    );
    // 0 = hide, 1 = toggled to show or single site creator, 2 = multisite site owner.
    $hide = ( 0 === $option || ( 2 === $option && wp_get_current_user()->user_email
    !== get_option( 'admin_email'
    ) ) ); if ( $hide ) {
        $classes .= ' hidden';
    }
    ?>

    <div id="welcome-panel" class="<?php echo esc_attr(
    $classes ); ?>">
        <?php wp_nonce_field( 'welcome-panel-nonce',
        'welcomepanelnonce', false
        ); ?>

        <a class="welcome-panel-close" href="<?php
        echo esc_url( admin_url(
        '?welcome=0' ) ); ?>" aria-label="<?php esc_attr_e( 'Dismiss the welcome panel' );
        ?>"><?php _e( 'Dismiss' ); ?></a>

        <?php
        /**
         * Add content to the welcome panel on the admin dashboard.
         *
         * To remove the default welcome panel, use remove_action():
         *
         * remove_action( 'welcome_panel', 'wp_welcome_panel' );
         *
         * @since 3.5.0
         */
        do_action( 'welcome_panel' );
        ?>

    </div>
<?php endif; ?>

    <div id="dashboard-widgets-wrap">
    <?php wp_dashboard(); ?>
    </div><!-- dashboard-widgets-wrap -->

</div><!-- wrap -->

<?php
wp_print_community_events_templates(
);

require_once ABSPATH . 'wp-admin/admin-footer.php';

```