

A MINI PROJECT REPORT

ON

Cloud Computing Project

Submitted in partial fulfillment of the requirement of the University of Mumbai for
the Course

Cloud Computing Lab
In
Computer Engineering (VIII SEM)

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CERTIFICATE

This is to certify that the requirements for the project report entitled '**Cloud Computing Project**' have been successfully completed by the following students:

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in partial fulfillment of the course Cloud Computing Lab in Computer Engineering (VIII SEM) of Mumbai University in the Department of Computer Engineering, A.P. Shah Institute of Technology, Thane – 400615 during the Academic Year 2021 – 22.

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PROJECT APPROVAL

This project entitled “Cloud Computing Project” by Atharva Ranade, Shyamkrishna Menon, and Omkar Thavai is approved for the course Cloud Computing Lab in Computer Engineering (VIII sem) of Mumbai University in the Department of Computer Engineering.

Subject Incharge: Prof. Deepak Khachane

Date:

Place: Thane

DECLARATION

We declare that this written submission for the Cloud Computing Lab mini-project entitled “Cloud Computing Project” represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and havenot misrepresented or fabricated or falsified any ideas/data/fact/source in our submission. We understand that any violation of the above will cause disciplinary action by the institute and also evoke penal action from the sources which have not been properly cited or from whom prior permission has not been taken when needed.

Project Group Members:

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Abstract

A Cloud in technical terms is nothing but a place at the other end of the internet connection where you can access apps and services, and where your data can be stored securely. A cloud environment doesn't need any effort on the user's part to maintain or manage it and it's effectively infinite in size, so one need not worry about it running out of capacity. Cloud-based applications and services can be accessed from anywhere globally just with a simple internet connection. The cloud has become so integral to our everyday lives that most people use it without even realizing it. In fact, for many people, life without the cloud would be radically different. There would be no Facebook, no Twitter, no Gmail, and no Spotify. The cloud has transformed the business landscape as millions of organizations worldwide rely on cloud services for everything from document creation and backup to social CRM and accounts. Cloud provides instant scaling, fast implementation, no up-front costs, and maintenance-free services with excellent security. As cloud services can be accessed from anywhere, our goal for this project was to deploy an application on the AWS Cloud environment such that it won't be system dependent and can be run on any device. In this project, we create a Library Management system which helps in maintaining data of books issued to learners and books available in the library. We have developed a project to help a library with some of its functions such as issuance, requesting and returning of books, etc. and deployed it on the cloud with the help of EC2 instance.

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Problem Definition

A library database system is an infrastructure that allows users to search books and book content, add/remove, and download selected books. The problem faced is that library users require an efficient method to find a specific book or keyword(s) within a book given a continuously expanding library. Since Cloud Computing is really booming in this world a certain Library aspires to improve the scaling of its business and so they decided to contact an IT consulting company to understand the factors on which a library can function on. The company decides to use Cloud Computing to deploy a working Library Management Software on the Cloud.

Introduction

Amazon Web Services (AWS) is the world's most comprehensive and broadly adopted cloud platform, offering over 200 fully featured services from data centers globally. AWS has significantly more services, and more features within those services, than any other cloud provider—from infrastructure technologies like compute, storage, and databases—to emerging technologies, such as machine learning and artificial intelligence, data lakes and analytics, and Internet of Things. This makes it faster, easier, and more cost effective to move your existing applications to the cloud and build nearly anything you can imagine.

To develop our project, we first understood that a library would require a databases and servers like MySQL and Apache. In this project, to deploy the application on cloud we have utilized one service of AWS which is EC2 Instance

AWS provides these services for user using the Free Tier in AWS but for specific intervals of time, which once exceed incurs some cost for the utilization of the resources. These services, combined helped us to deploy our application in the cloud environment and access it without having to depend on the system on which it was developed.

Project Design Flow



Fig. 1: Flow of Events

Description

The cloud services used in this project have different functionalities which are explained below.

- **EC2 Instance:** Amazon Elastic Compute Cloud (Amazon EC2) offers the broadest and deepest compute platform, with over 500 instances and choice of the latest processor, storage, networking, operating system, and purchase model to help you best match the needs of your workload. They are the first major cloud provider that support Intel, AMD, and Arm processors, the only cloud with on-demand EC2 Mac instances, and the only cloud with 400 Gbps Ethernet networking. They offer the best price performance for machine learning training, as well as the lowest cost per inference instances in the cloud. More SAP, high performance computing (HPC), ML, and Windows workloads run on AWS than any other cloud.

EC2 allows users to Access reliable, scalable infrastructure on demand, scale capacity within minutes with SLA commitment of 99.99% availability, optimize performance and cost with flexible options like AWS Graviton-based instances, Amazon EC2 Spot instances, and AWS Savings Plans, and provide secure compute for all applications.

EC2 Use Cases:

- ☐ Run cloud-native and enterprise applications:

Amazon EC2 delivers secure, reliable, high-performance, and cost-effective compute infrastructure to meet demanding business needs.

- ☐ Scale for HPC applications:

Access the on-demand infrastructure and capacity you need to run HPC applications faster and cost-effectively.

□ Train and deploy ML applications:

Amazon EC2 delivers the broadest choice of compute, networking (up to 400 Gbps), and storage services purpose-built to optimize price performance for ML projects.

- **XAMPP:** XAMPP is one of the widely used cross-platform web servers, which helps developers to create and test their programs on a local webserver. It was developed by the Apache Friends, and its native source code can be revised or modified by the audience. It consists of Apache HTTP Server, MariaDB, and interpreter for the different programming languages like PHP and Perl. It is available in 11 languages and supported by different platforms such as the IA-32 package of Windows & x64 package of macOS and Linux. XAMPP helps a local host or server to test its website and clients via computers and laptops before releasing it to the main server. It is a platform that furnishes a suitable environment to test and verify the working of projects based on Apache, Perl, MySQL database, and PHP through the system of the host itself. Among these technologies, Perl is a programming language used for web development, PHP is a backend scripting language, and MariaDB is the most vividly used database developed by MySQL. XAMPP is used to symbolize the classification of solutions for different technologies. It provides a base for testing of projects based on different technologies through a personal server. XAMPP is an abbreviated form of each alphabet representing each of its major components. This collection of software contains a web server named Apache, a database management system named MariaDB and scripting/ programming languages such as PHP and Perl. X denotes Cross-platform, which means that it can work on different platforms such as Windows, Linux, and macOS.
- **MySQL:** MySQL is an open-source relational database management system. As with other relational databases, MySQL stores data in tables made up of rows and columns. Users can define, manipulate, control, and query data using Structured Query Language, more

commonly known as SQL. A flexible and powerful program, MySQL is the most popular open-source database system in the world. As part of the widely-used LAMP technology stack (which consists of a Linux-based operating system, the Apache web server, a MySQL database, and PHP for processing), it's used to store and retrieve data in a wide variety of popular applications, websites, and services.

- **Apache:** The Apache HTTP Server is a free and open-source cross-platform web server software, released under the terms of Apache License 2.0. Apache is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation. Apache supports a variety of features, many implemented as compiled modules which extend the core functionality. These can range from authentication schemes to supporting server-side programming languages such as Perl, Python, Tcl and PHP. Popular compression methods on Apache include the external extension module, `mod_gzip`, implemented to help with reduction of the size (weight) of web pages served over HTTP. Throughout the last few decades, Apache has proven to be a staple in many popular stacks and the backbone of the early internet year. While it's popularity is declining and the options of web server choices are increasing, Apache still plays a pivotal role in many technology stacks and companies system infrastructure. Even with new technologies and servers coming out nonstop, Apache is still a technology every developer should learn how to handle and configure.

Literature Survey

- **Implementation of Storage in Virtual Private Cloud using Simple Storage Service on AWS**

Ambika Gupta¹ , Anjani Mehta, Lakshya Daver, Priya Banga, 2020

The primary objective of this research work is to develop a framework that permits confirmed clients to get access to the sensitive information within the organization. In contrast to the traditional system, the proposed system helps in data recovery if there arise any circumstances, the storage can be expanded by checking the accessibility of users logged into the storage system to access the data.

- **Cloud Computing: Fundamentals and Research Issues Suyel Namasudra, Pinki Roy, Balamurugan Balusamy, 2017**

In the first part of this paper, a brief discussion of fundamentals of cloud computing are presented. Moreover, all the issues of cloud computing are also discussed in this paper. Finally, future work directions have been identified for the cloud computing environment

- **Amazon EC2**

Amazon Elastic Compute Cloud (Amazon EC2) offers the broadest and deepest compute platform, with over 500 instances and choice of the latest processor, storage, networking, operating system, and purchase model to help you best match the needs of your workload. We are the first major cloud provider that supports Intel, AMD, and Arm processors, the only cloud with on-demand EC2 Mac instances, and the only cloud with 400 Gbps Ethernet networking. We offer the best price-performance for machine learning

training, as well as the lowest cost per inference instance in the cloud. More SAP, high performance computing (HPC), ML, and Windows workloads run on AWS than any other cloud.

Implementation

The following steps and screenshots depict the implementation of deployment of the application on AWS Cloud environment.

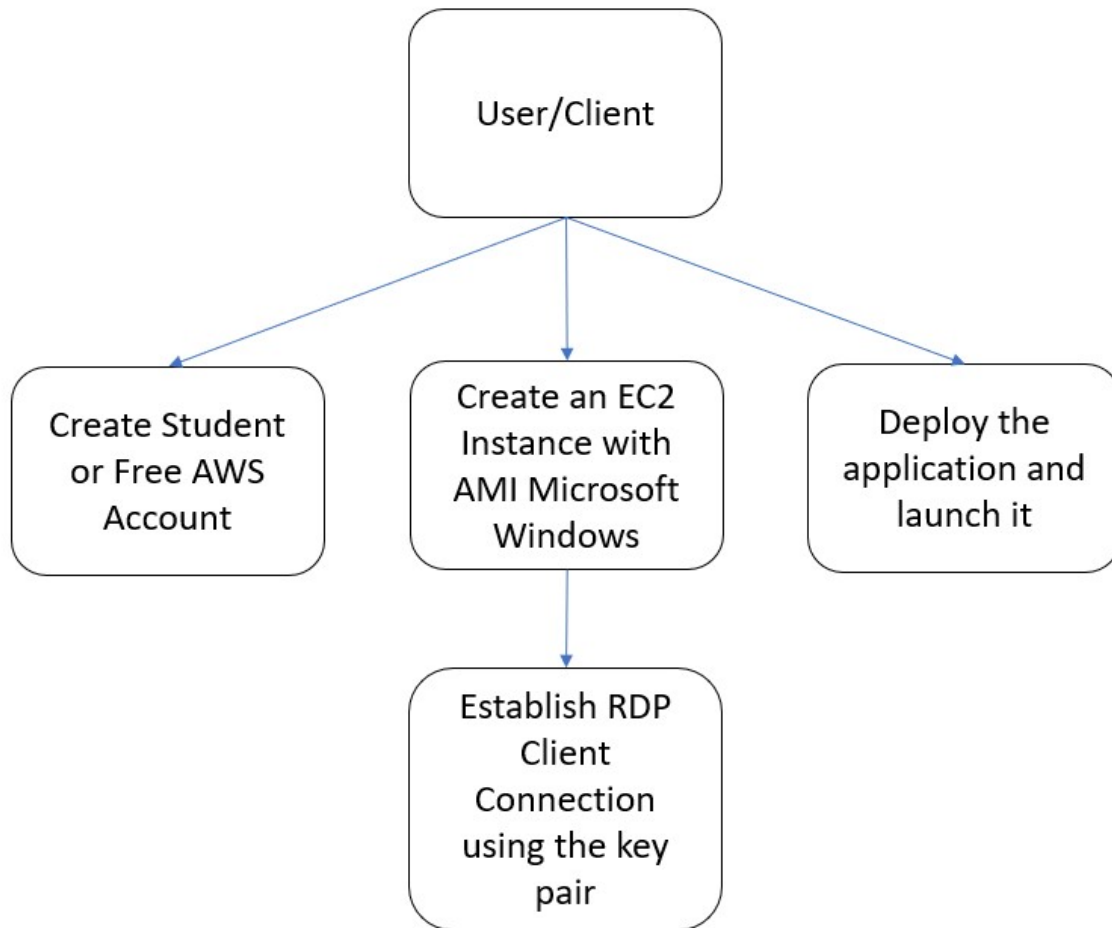
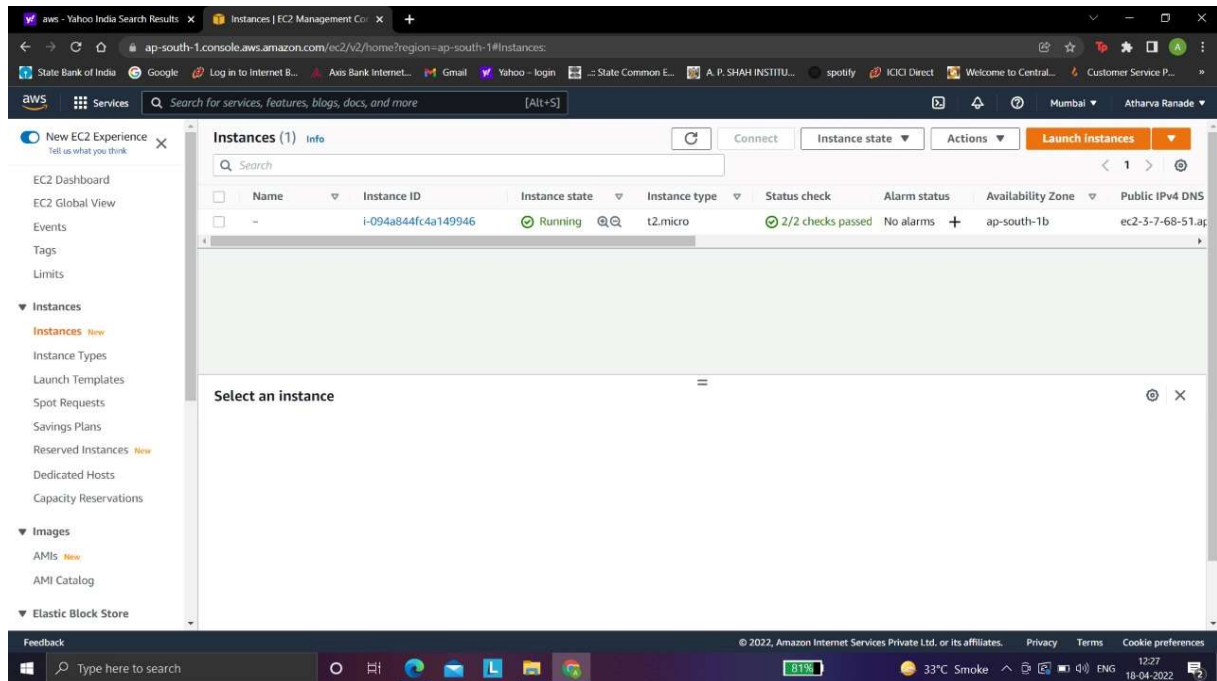


Fig.2 Use-Case Diagram

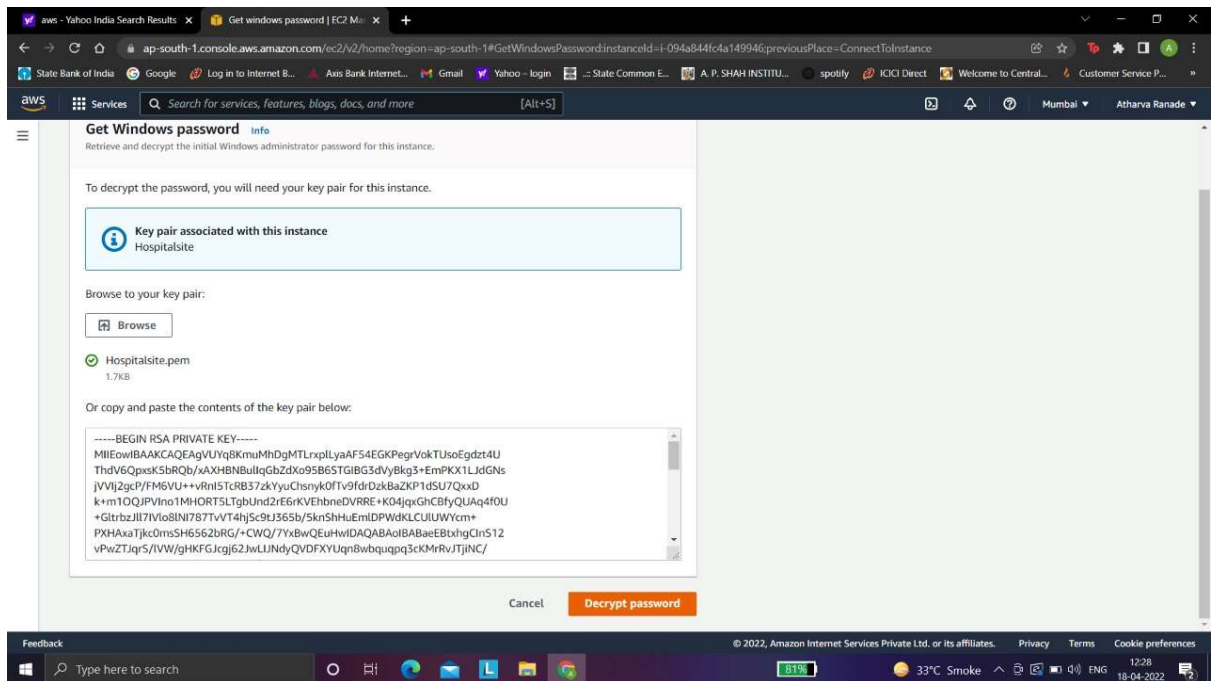
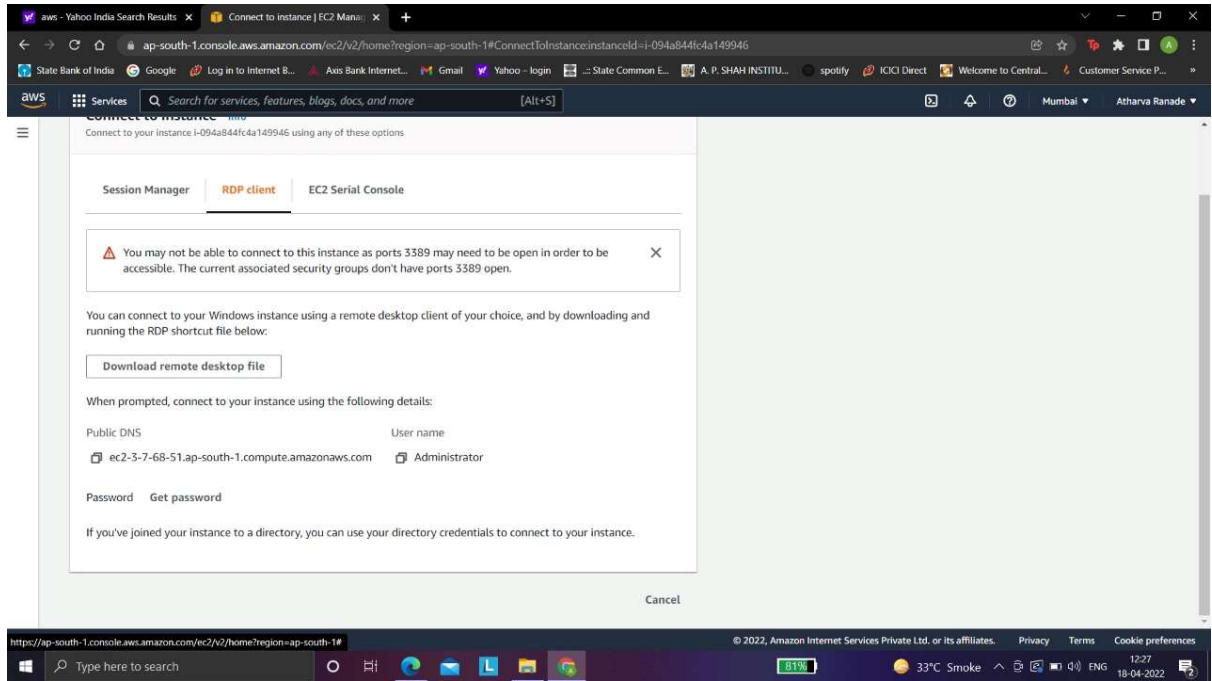
1. Create an EC2 Instance next. Make the following changes while creating an Instance.
 - A. Choose AMI: Microsoft Windows Server 2022 Base (in Free Tier)

- B. Instance Type: t2.micro
- C. No change in Instance Details.
- D. No change in Storage. Assigned storage is sufficient.
- E. Add a tag: Key: Name , Value: instance_1 (name of instance you want)
- F. Security Group Configuration: Add Rules: Custom TCP protocol and set port number to 8080. Add HTTP and HTTPS rules as well.
- G. When asked for Key Pair, select Create a new Key Pair. Name the Key Pair and create. A .pem file will be downloaded. Know the location of this file for further use.
- H. Launch the instance
- I. Go to EC2>>Instances and wait for the Instance State to display Running and Status Check to display 2/2 checks passed before proceeding.



2. Create RDP Connect.

- A. Select the instance you created and click on Connect in top panel.
- B. Navigate to RDP Client section.
- C. Click on Download remote desktop file, and a .rdp file will be downloaded.
- D. In the password section, click on Get Password.
- E. Here, browse and select the Key Pair file we downloaded in the previous step in .pem format. Click on Decrypt Password. You will be redirected to the previous page and will see the password.
- F. Open the .rdp file now. Click on Connect in the pop-up. You will be asked to enter a password for the Administrator user. Copy the Decrypted password from the console and past in the dialogue box and connect to the RDP client. Click on Yes if another pop-up appears.
- G. As we have chosen Windows AMI, a VM will open up with Windows OS. Wait till you see the instance details on the Desktop of this VM before moving further. Select Refresh by right-clicking in the VM if you don't see the details in the top right corner.
- H. RDP Connection is now established.
- I. To run this project, install Python and/or Xampp if you wish to check the SQL connectivity. You open Apache and MySQL connection on Xampp, create a database by the name of text_summarizer in phpMyAdmin and import the .sql file.



3. Installing XAMPP

Our XAMPP tutorial will take you through the installation process for the software package on

Windows. If you're using Linux or Mac OS X, then the steps listed below for the installation process may differ.

A. Step 1: Download

XAMPP is a release made available by the non-profit project Apache Friends. Versions with PHP 5.5, 5.6, or 7 are available for download on the Apache Friends website.

B. Step 2: Run .exe file

Once the software bundle has been downloaded, you can start the installation by double clicking on the file with the ending.exe.

C. Step 3: Deactivate any antivirus software

Since an active antivirus program can negatively affect the installation process, it's recommended to temporarily pause any antivirus software until all XAMPP components have successfully been installed.

D. Step 4: Deactivate UAC

User Account Control (UAC) can interfere with the XAMPP installation because it limits writing access to the C: drive, so we recommend you deactivate this too for the duration of the installation process. To find out how to turn off your UAC, head to the Microsoft Windows support pages.

E. Step 5: Start the setup wizard

After you've opened the .exe file (after deactivating your antivirus program(s) and taken note of the User Account Control, the start screen of the XAMPP setup wizard should appear automatically. Click on 'Next' to configure the installation settings.

F. Step 6: Choose software components

Under 'Select Components', you have the option to exclude individual components of the XAMPP software bundle from the installation. But for a full local test server, we recommend you install using the standard setup and all available components. After making your choice, click 'Next'.

G. Step 7: Choose the installation directory

In this next step, you have the chance to choose where you'd like the XAMPP software packet to be installed. If you opt for the standard setup, then a folder with the name XAMPP will be created under C:\ for you. After you've chosen a location, click 'Next'.

H. Step 8: Start the installation process

Once all the aforementioned preferences have been decided, click to start the installation. The setup wizard will unpack and install the selected components and save them to the designated directory. This process can take several minutes in total. You can follow the progress of this installation by keeping an eye on the green loading bar in the middle of the screen.

I. Step 9: Windows Firewall blocking

Your Firewall may interrupt the installation process to block the some components of the XAMPP. Use the corresponding check box to enable communication between the Apache server and your private network or work network. Remember that making your XAMPP

server available for public networks isn't recommended.

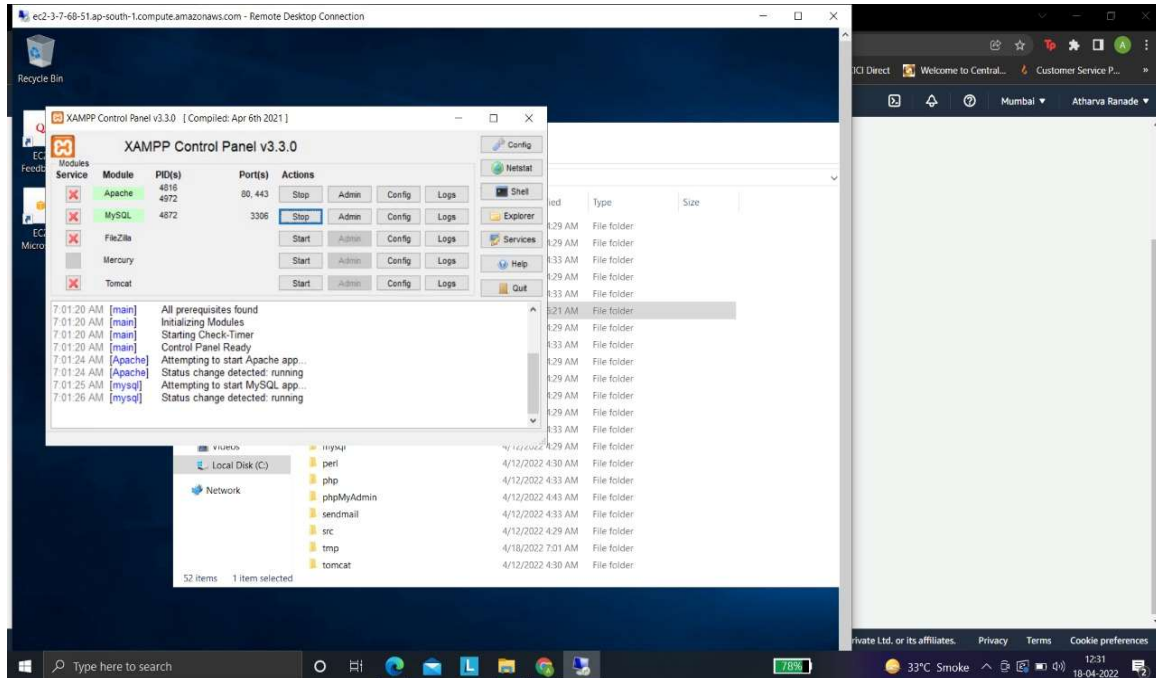
J. Step 10: Complete installation

Once all the components are unpacked and installed, you can close the setup wizard by clicking on 'Finish'. Click to tick the corresponding check box and open the XAMPP Control Panel once the installation process is finished.

K. The XAMPP Control Panel

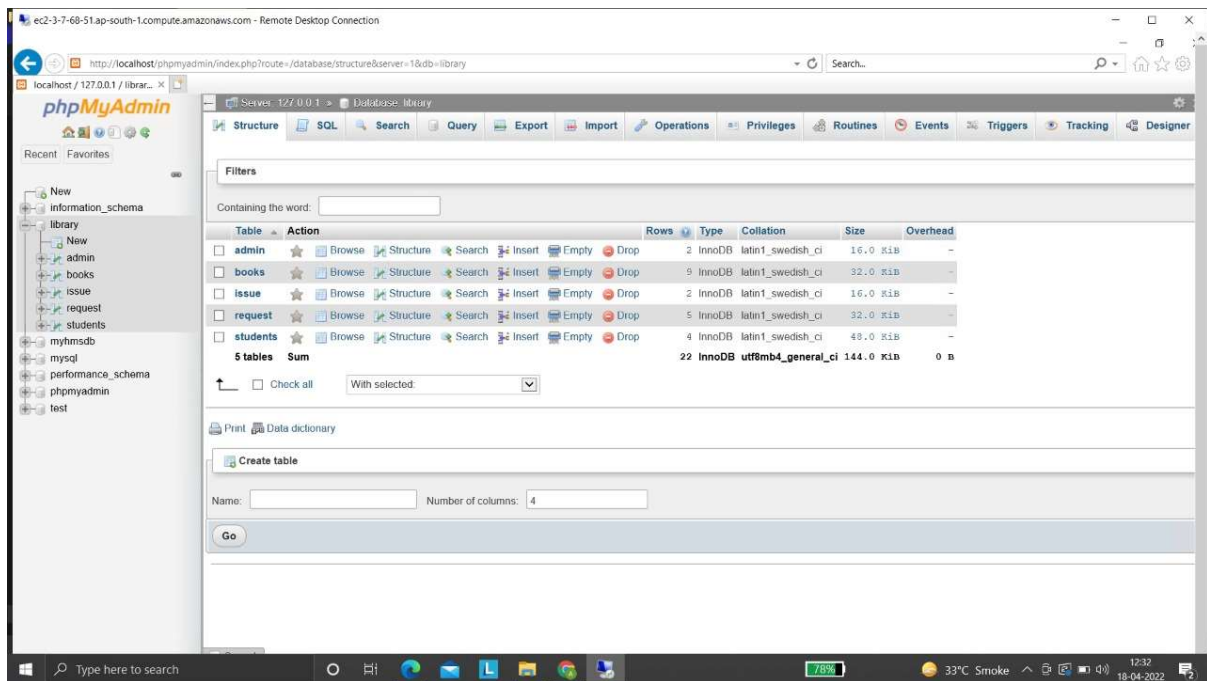
Controls for the individual components of your test server can be reached through the XAMPP Control Panel. The clear user interface logs all actions and allows you to start or stop individual modules with a single. The XAMPP Control Panel also offers you various other buttons, including:

- i. Config: allows you to configure the XAMPP as well as the individual components
- ii. Netstat: shows all running processes on the local computer
- iii. Shell: opens a UNIX shell
- iv. Explorer: opens the XAMPP folder in Windows Explorer
- v. Services: shows all services currently running in the background
- vi. Help: offers links to user forums
- vii. Quit: closes the XAMPP Control Panel

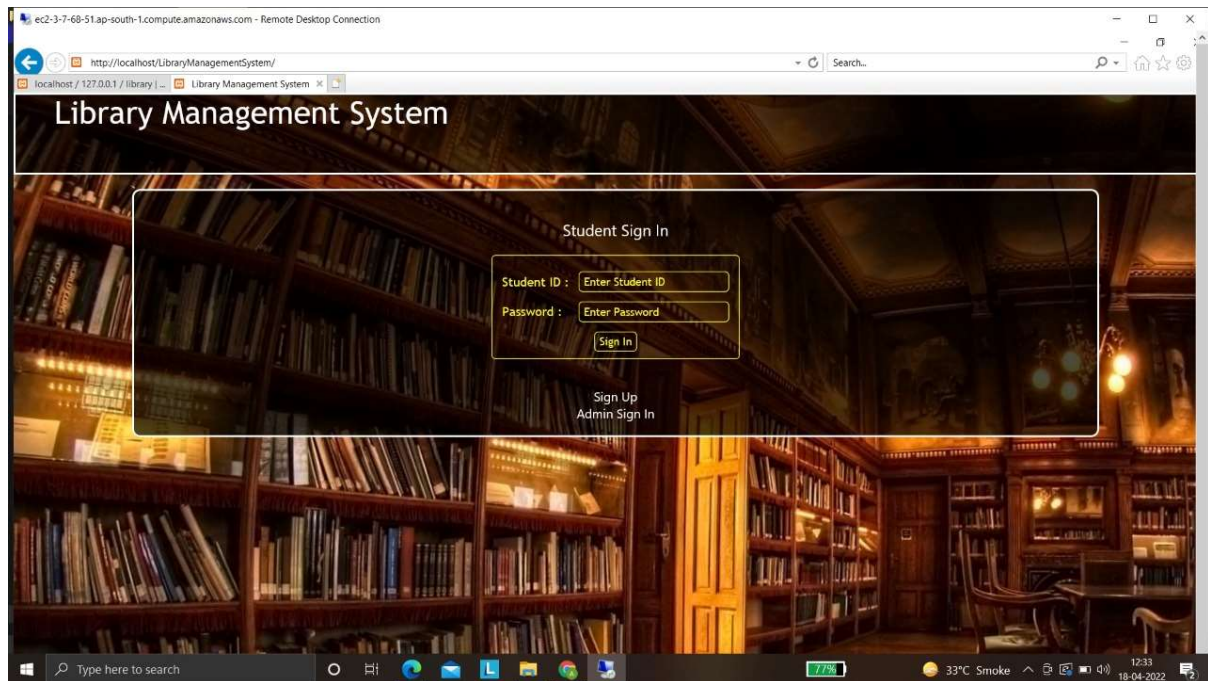


L. Database and table creation

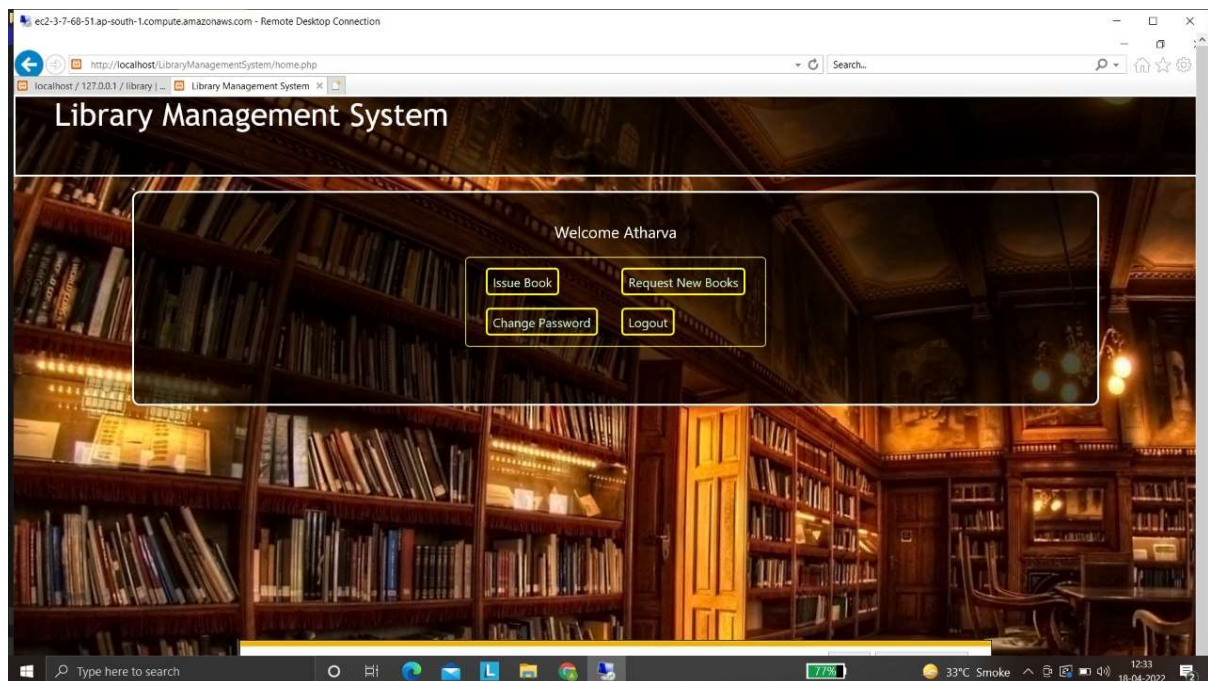
Database and all of its tables are shown in the following screenshot



M. Deployed application



Student login page



Student after signing in

Library Management System

Student Registration

Name :

Email ID :

Sem :

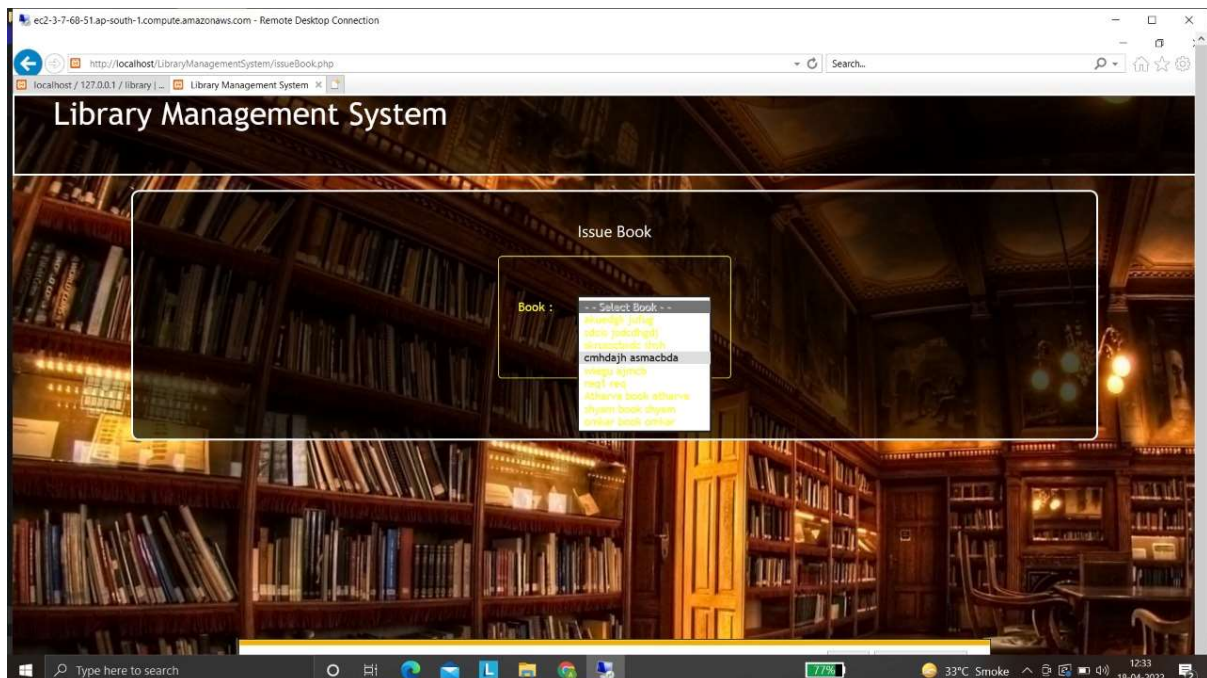
Branch :

Student ID :

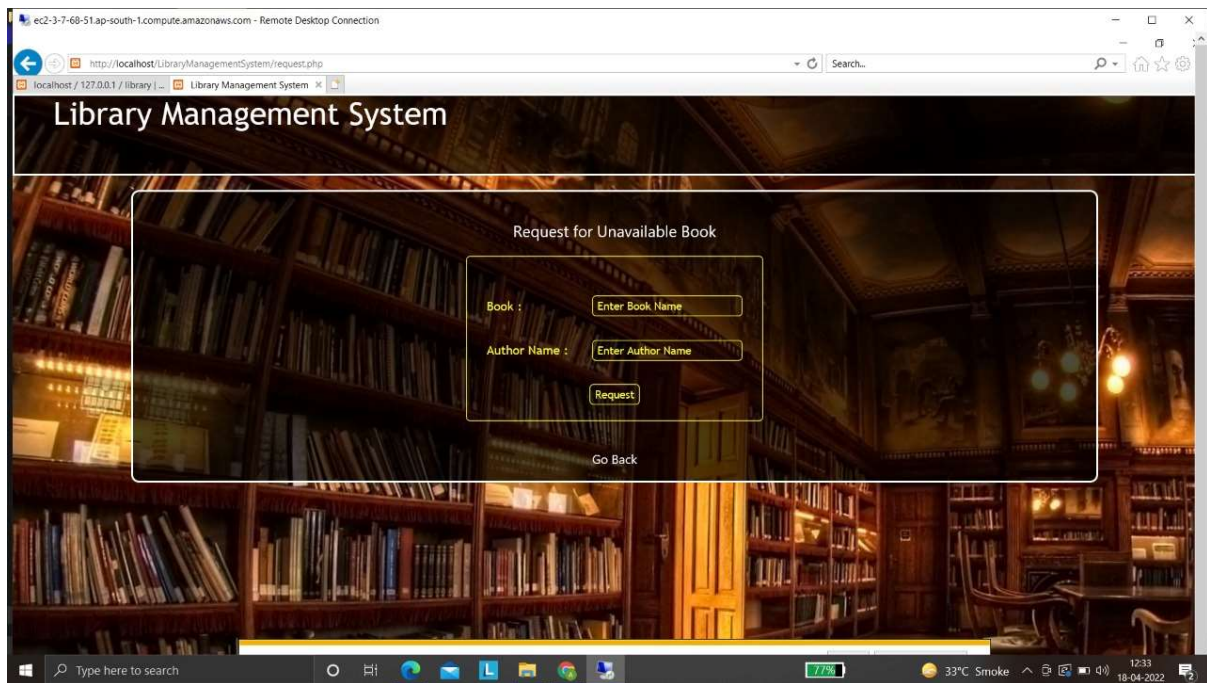
Password :

[Go Back](#)

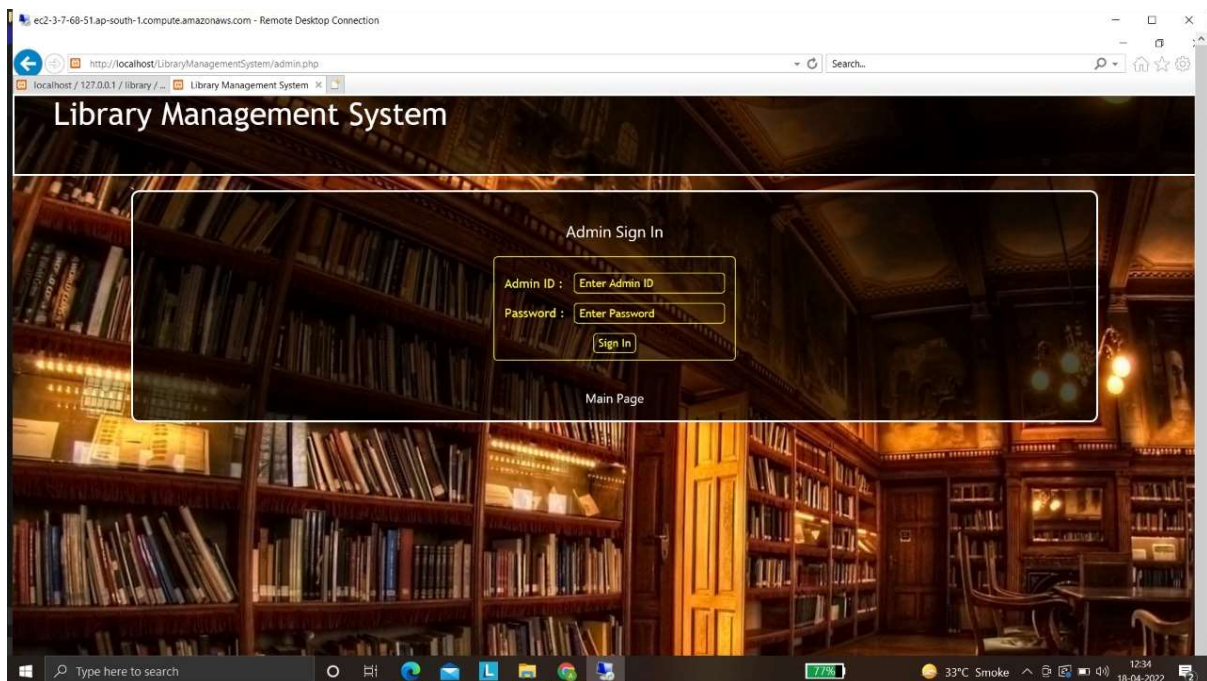
Student registration page



Book issue page



Request for unavailable book page



Admin sign-in page

Summary

By the means of this project, we learned to implement the concepts of Cloud Computing such as Software as a Service. Software as a service (or SaaS) is a way of delivering applications over the Internet—as a service. Instead of installing and maintaining software, you simply access it via the Internet, freeing yourself from complex software and hardware management. SaaS applications are sometimes called Web-based software, on-demand software, or hosted software.

Learning Outcomes

The main aim of this project was to understand the concepts of cloud computing and implement them by the means of a project. During the course of development of this project we learned to use the AWS Cloud console in terms of using the different services provided by AWS. We have studied and implemented the following concepts and used the cloud services:

- Software as a Service
- EC2

References

- <https://aws.amazon.com/ec2/>
- <https://aws.amazon.com/websites/>
- <https://www.signitysolutions.com/blog/register-host-and-deploy-website-on-aws/>
- <https://www.guru99.com/what-is-aws.html>

Acknowledgement

We have deployed our website on AWS Cloud with help of guidelines provided by the AWS Account. This was possible only by the support of our subject incharge and our department to whom we express our gratitude.