IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

From Grapes to Clicks : A Cloud-Based Wine-Selling Solution for Single Vendors

Dr. Deepali Sale[1], Piyush Ahire[2], Manoday Ahire[3], Amey Patil[4], Hemant Chaudhari[5]
Assistant Professor, Department of Computer Engineering[1]
BE Students, Department of Computer Engineering[2,3,4,5]
Dr. D.Y. Patil College of Engineering & Innovation, Pune, India
deepalisale@gmail.com[1],ahirepiyush269@gmail.com[2],
manodayahire786@gmail.com[3], ameyp686@gmail.com[4], hemantc639@gmail.com[5]

Abstract: *This document outlines the design and creation of a robust wine vending application for a single vendor, which combines a web platform, an Android mobile app, and a cloud-based framework. This solution addresses the increasing demand for online wine sales while delivering a smooth, secure, and adaptable shopping experience. Essential features of the system include an intuitive web interface and an application focused on effective product searching, ordering, and payment processing. Cloud infrastructure is implemented to guarantee high availability, scalability, and secure data management. The paper discusses various architectural alternatives, such as utilizing cloud services for load balancing, data handling, and disaster recovery. It also emphasizes the necessity of strong security protocols, including encryption, user authentication, and adherence to industry standards for online transactions. Additionally, the document addresses challenges related to regulatory compliance, including age verification mandates and data protection laws. Lastly, it explores strategies for performance enhancement, improvements to user experience, and potential avenues for future expansion. The proposed solution aims to deliver a dependable, secure, and scalable platform tailored to the requirements of individual wine retailers while accommodating future growth.*

Keywords: Wine-selling application, Cloud architecture, Android application, Scalability, Security, User authentication

I. INTRODUCTION

The swift expansion of e-commerce has transformed the retail sector, prompting the wine industry to increasingly utilize digital platforms to cater to consumer preferences for convenience. This document examines creating a single-vendor wine sales application that incorporates a web interface, an Android mobile app, and a cloud-based backend. Developed to deliver a smooth and effective user experience, the platform allows customers to explore products, place orders, and complete secure transactions effortlessly. The cloud infrastructure guarantees scalability, high availability, and data protection, enabling the system to manage fluctuating traffic demands and accommodate business growth. Security remains a vital focus, featuring protocols like encryption, user authentication, and adherence to industry regulations concerning online payments and data safeguarding. Additionally, the platform confronts issues in the online wine market, such as age verification and compliance with legal requirements. By integrating advanced technologies with a focus on both functionality and regulatory adherence, this application presents a scalable, secure, and user-centric solution designed to meet the needs of wine vendors and consumers in the digital age.

II. LITERATURE REVIEW

The first question you should ask concerns the value of moving a classic web application hosting solution into the AWS Cloud. If you decide that the cloud is right for you, you'll need a suitable architecture. This section helps you evaluate an AWS Cloud solution. It compares deploying your web application in the cloud to on-premises deployment, presents an AWS Cloud architecture for hosting your application, and discusses the key components of the AWS Cloud Architecture solution. This whitepaper primarily focuses on a more traditional web architecture. However, consider

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

modernizing your web applications by moving to Containers and leveraging services like AWS Fargate and Serverless technologies, AWS Lambda to enable you to abstract away the use of virtual machines to perform computing tasks. With serverless computing, infrastructure management tasks like capacity provisioning and patching are handled by AWS, so you can build more agile applications that allow you to innovate and respond to change faster.[1]

Issues in Cross-platform Development:- After the initial searches in electronic databases, the selection process is conducted. The journals without empirical evidence related to the issues and challenges of cross-platform development are separated and the remaining journals are acquired to be analyzed further in the next phase. Furthermore, the issues and the challenges from the reviewed journals are listed and the overview of each issue is summarized. The additional searches through references are also conducted in this phase where the researcher further investigated the references of the initially found papers and the references made to those papers.PWA technology has been highlighted in this phase. The performance of this technology has been compared to the other solutions that have been used in the past years. The researcher also has comprehensively assessed the competing concepts for developing multiplatform apps and scrutinized the PWA as a novel technology to overcome the shortcomings of existing cross-platform development approaches.[2]

Security plays an important role in the wider acceptance of cloud computing services. Existing literature is focused on different security solutions, including technology and security policy implementation. The latter study introduced new attacks on the cloud environment from criminological perspectives. The proposed solution to these recent attacks is based on criminal theories for the protection of the cloud. A study [3] identified several security issues affecting cloud computing attributes. The same research proposes to overcome the identified problems concerning the security of the cloud. A security guide, developed in this research, enables cloud user organizations to be aware of security vulnerabilities and approaches to invade them. Security vulnerabilities and challenges arise from the usage of cloud computing services. Currently, cloud computing models are the primary source of these challenges and vulnerabilities. The intruders exploit the weakness of cloud models in accessing the user's private data, by attacking the processing power of computer systems.[3]

When making a request Hypertext Transfer Protocol (HTTP) authentication requires the client to pass a username and associated password. This mechanism does not involve cookies or sessions this is the easiest way to impose restrictions on access. To make use of this, the client must provide an authorization header with each request. Generally, the user ID and password are not encrypted. This method is simple to use and implement and the API's are faster since they require no complex encryption or decryption

1. Get the username and password from user
2. Encode it using the Base64 algorithm
3. Set it in the authorization header and send it along with each HTTP Request. [4]

III. MOTIVATION AND OBJECTIVE

3.1 Motivation

The impetus for creating a single-vendor wine-selling application arises from the escalating demand for convenience among consumers and the increasing prevalence of online shopping within the wine sector. As more buyers gravitate towards digital platforms for their purchases, it becomes essential for wine sellers to evolve to maintain their competitive edge. While many current solutions focus on multi-vendor marketplaces, smaller enterprises often need customized, budget-friendly platforms that cater to their unique requirements. This project aims to bridge that gap by providing a dedicated solution for individual wine sellers, enabling them to connect directly with their customers via an efficient and user-friendly platform.

Moreover, the application intends to tackle several distinct challenges pertinent to online wine retailers, such as adhering to legal standards for age verification, ensuring secure payment processing, and managing alcohol distribution logistics. By incorporating cloud technology, the platform is built to offer scalability and consistent availability, allowing businesses to expand without sacrificing performance. Prioritizing security through the use of encryption, authentication measures, and compliance with privacy laws guarantees that sensitive customer information and transactions remain safeguarded. Ultimately, the goal is to develop a holistic, accessible, and secure application that

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

empowers wine sellers to capitalize on the burgeoning e-commerce landscape while addressing the specific challenges within the industry.

The key motivations behind this project are:

1. Rising Demand for Online Wine Sales.
2. Tailored Solution for Single Vendors.
3. Legal and Compliance Challenges.
4. Improve Scalability and Flexibility.
5. Enhanced Customer Experience.

3.2 Objective

1. Develop a Seamless User Experience.
2. Ensure Scalability with Cloud Architecture.
3. Scalability and Performance disaster recovery and backups with proper maintenance.
4. Future-Proof the Platform to accommodate Future Enhancements.

IV. METHODOLOGY AND ARCHITECTURE

4.1 System Architecture

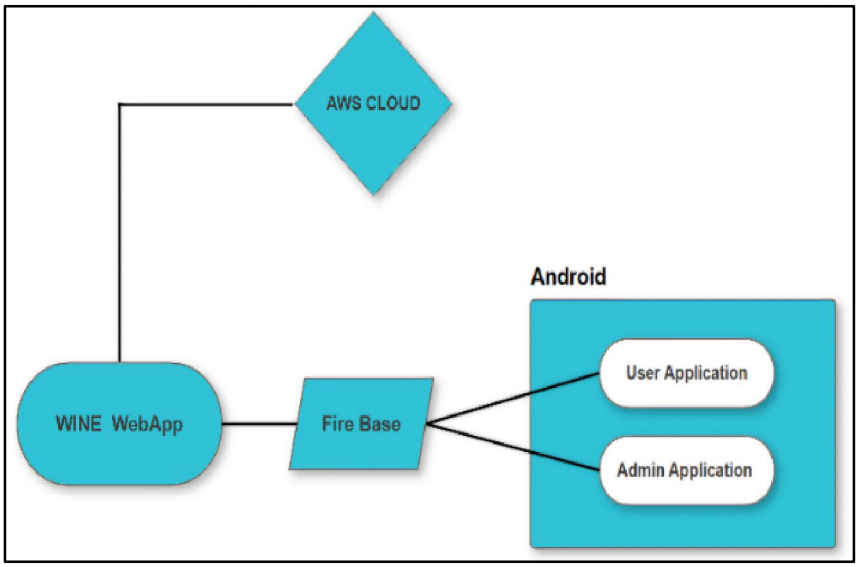

Fig 4.1.1 System Architecture

4.2 Security Practices

Data Encryption:

Employ encryption standards (such as SSL/TLS) for data in transit to safeguard sensitive information exchanged between users and the server. To thwart unauthorized access, use encryption for sensitive data stored at rest, including customer details and payment information.

User Authentication and Authorization:

Adopt robust user authentication techniques, such as multi-factor authentication (MFA), to reinforce during the login process. Implement role-based access control (RBAC) to limit access to sensitive features based on user roles, ensuring that only permitted individuals can utilize certain functionalities.

Secure Payment Processing:

Connect with trustworthy payment gateways that adhere to the Payment Card Industry Data Security Standard (PCI DSS) for the secure handling of payment transactions. Refrain from saving sensitive payment data on application servers; instead, employ tokenization or payment tokens for transaction processing.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

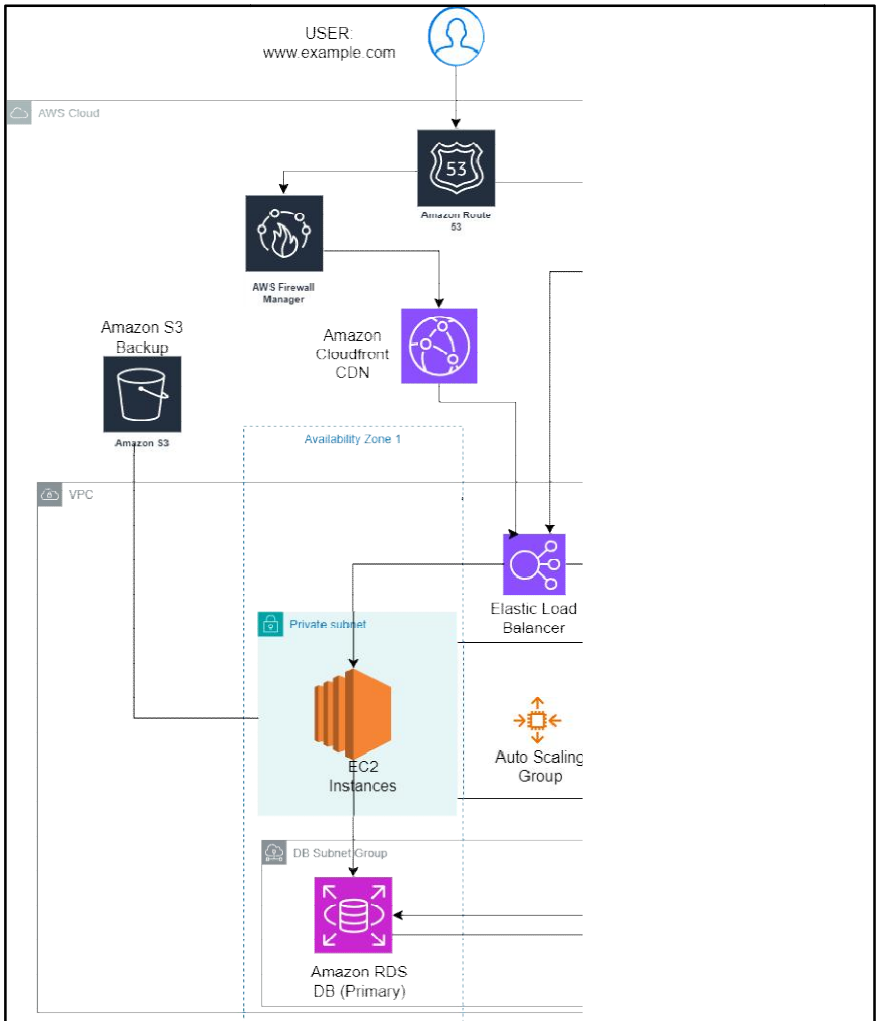

Fig 4.1.2 Cloud Architecture

Regular Security Audits and Testing:

Perform consistent security evaluations, including penetration testing and vulnerability assessments, to uncover and address potential security flaws. Establish an ongoing monitoring system to rapidly identify and respond to security incidents.

Input Validation and Sanitization:

Verify and sanitize all user inputs to defend against prevalent attacks like SQL injection and cross-site scripting (XSS). Utilize prepared statements and parameterized queries for database operations to avert injection attacks.

Session Management:

Apply secure session management techniques, including session expiration, secure cookie attributes (HttpOnly and Secure), and regenerating session IDs upon login to mitigate session hijacking. Regularly terminate sessions and provide a logout option for users.

Compliance with Data Protection Regulations:

Ensure adherence to pertinent data protection laws (e.g., GDPR, CCPA) by formulating data handling and privacy protocols that secure user information. Supply users with transparent privacy notices and options for managing their data, including access, correction, and removal of their personal information.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

Incident Response Plan:

Create a detailed incident response strategy that defines the steps to undertake in the event of a security breach, including notification protocols and remediation plans. Educate staff on security awareness and response procedures to guarantee preparedness in the face of a security incident.

IN USE AWS CLOUD SERVICES	
1.	Amazon EC2 (Elastic Compute Cloud)
2.	Amazon S3 (Simple Storage Service)
3.	Amazon RDS (Relational Database Service)
4.	Amazon API Gateway
5.	AWS Lambda
6.	Amazon Cognito
7.	AWS Cloud Front
8.	Amazon Route 53
9.	AWS Cloud Trail
10.	AWS Cloud Watch
11.	AWS WAF (Web Application Firewall)
12.	AWS Elastic Load Balancing (ELB)
13.	FAWS IAM (Identity and Access Management)
14.	Amazon SNS (Simple Notification Service)

4.2.1 In use AWS cloud services

Product Recommendation System using Machine Learning

The implementation of recommendation systems offers significant insights for brands aiming to fulfill consumer needs, boost revenue, and enhance customer relations. There are three primary categories of recommendation strategies that help determine which products should be featured in the user experience. Selecting the most effective strategy involves an assessment of the available customer product data, as well as their position within the purchasing process. As illustrated in the following figure, these include:

A. Global strategies: This straightforward method recommends popular, well-recognized, or trending products, benefiting both new and returning customers.

B. Contextual strategies: This method takes into account the context of the product, including attributes such as shape, color, category, and purchasing frequency, to suggest relevant items to consumers.

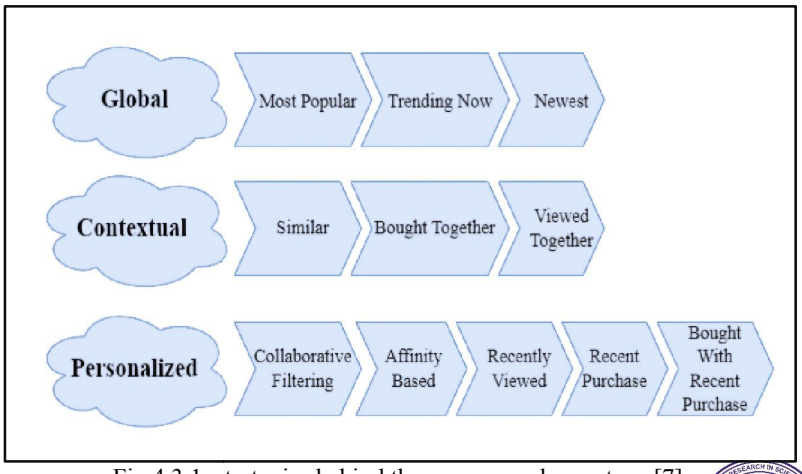

Fig 4.3.1 strategies behind the recommender-systems[7]

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

C. Personalized recommendation strategies: This is the most advanced approach, which considers both contextual factors and individual user behavior. By utilizing available usage data and product information, it generates tailored suggestions unique to each user. This allows companies to effectively engage customers by leveraging their behavioral data, such as items added to carts, purchase history, clicks, preferences, and more. [7]

Enhancing the customer experience with virtual and augmented reality

Virtual and augmented reality are transforming the ways businesses engage with their customers. Nonetheless, earlier studies have largely overlooked an analysis of their effectiveness in comparison. This research investigates how different kinds of content (real versus digital) and devices (head-mounted displays versus smartphones) shape users' perceptions of presence, particularly regarding their prior experiences with hotels. Findings from a lab-based experiment indicate that content characterized by high factual realism, such as 360-degree videos, significantly enhances perceptions of presence, ease of imagination, visual attractiveness, and intentions to book. These positive effects are amplified when high-embodiment devices like head-mounted displays are used. Furthermore, perceptions of presence also positively influence ease of imagination and visual appeal, serving as mediators between content and booking intentions. These results highlight the crucial role of fostering presence as an essential factor driving behavioral intentions within the hospitality sector.

H1. : Viewing real (versus digital) contents will have a positive impact on the perceptions of presence.
H2. : Viewing real (versus digital) contents will have a positive impact on the ease of imagination.
H3. : Viewing real (versus digital) contents will have a positive impact on the perceptions of visual appeal.
H4. : Viewing real (versus digital) content will have a positive impact on booking intentions.
H5. : The effect of viewing real (versus digital) contents on
(a) presence,
(b) ease of imagination,
(c) perceptions of visual appeal, and
(d) booking intentions will be stronger with HMDs than with smartphones.[9]

V. PROJECT FEASIBILITY AND SCOPE

The potential for developing a single-vendor wine-selling application is highlighted by the growing consumer interest in online purchasing options within the wine sector. As the global e-commerce market for wine is anticipated to expand considerably, this application offers a specialized solution tailored for individual vendors. Utilizing cloud-based architecture enables the project to ensure scalability and adaptability, allowing the platform to handle various traffic levels and future growth. The technical feasibility is reinforced by the existence of reliable frameworks and technologies for both web and mobile application development, complemented by strong cloud services that bolster security and data management. Market analysis reveals a positive environment for this initiative, as shoppers increasingly desire convenience and customized experiences when buying wine online.

The project's scope includes the creation of a comprehensive wine-selling application that will feature both a web interface and an Android mobile app. Essential functionalities will involve intuitive product browsing, secure payment processing, and effective inventory management. The application will implement rigorous security measures, such as data encryption, user authentication, and compliance with legal standards related to alcohol sales—ensuring age verification and adherence to data protection laws. The project will also investigate the incorporation of marketing tools designed to boost customer engagement and loyalty. While the main emphasis is on the core features for a single vendor, future improvements may encompass multi-vendor support and additional functionalities based on user input. Ultimately, the project aims to offer a scalable, secure, and user-focused solution that aligns with the dynamic needs of the wine-selling industry.

VI. CONCLUSION

Creating a dedicated wine-selling application provides a unique opportunity to meet the growing demand for online wine purchases through a secure and user-friendly platform. By incorporating web and Android features and a robust cloud infrastructure, the application is designed to ensure scalability, consistent availability, and efficient inventory and

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

transaction management. Prioritizing robust security measures, such as data encryption, reliable payment processing, and user authentication, will protect sensitive customer data and build trust in the platform. Additionally, the application aims to navigate the complex legal framework surrounding online alcohol sales, ensuring compliance with age verification and data protection laws. This project not only enhances the purchasing experience for consumers but also supports wine vendors in thriving in the evolving digital marketplace, positioning them for future growth and success.

REFERENCES

[1]. Bader Alouffi, Hashem Alyami, MuhammadAyaz, Abdullah Alharbi, WaelAlosaimi "A Systematic Literature Review on Cloud Computing Security: Threats and Mitigation Strategies" from IEEE ACCESS April 14,2021.

[2]. Mole, Patrick V. published "Progressive Web Apps: A Novel Way for Cross-Platform Development" by Research Gate in September 2020.

[3]. Amir Khairalomoum, Dinesh Subramani, Jack Hemion, "Web Application Hosting in the AWS Cloud" in AWS WhitepaperAugust 20, 2021

[4]. Maria Papathanasaki, LeandrosMaglaras, and Nick Ayres "Modern Authentication Methods: A Comprehensive Survey" Articlein AI Computer Science and Robotics Technology, Research Gate· June 2022.

[5]. Ahmet Bucko ,KamerVishi , BujarKrasniqi , andBlerimRexha "Enhancing JWT Authentication and Authorization in Web Applications Based on User Behavior History" MDPI journal 13 April 2023.

[6]. Jean-François Outreville "The Price of Wine: Does the Bottle Size Matter?" Palgrave Macmillan, a division of Macmillan Publishers Limited 2013.

[7]. OjasPhokmare, PrathmeshParihar, Prof. Komal M. Birare "Product Recommendation System using Machine Learning" in IJNRD | Volume 8, Issue 7 July 2023.

[8]. ShrikrishnaDhale, Dileep Kumar Singh, HemrajKawadkar, Varun Dubey "Adoption of Virtual Reality (VR) and Augmented Reality (AR) in the Marketing Sphere" Research Gate Article, August 2023.

[9]. Carlos Orús, Sergio Ibanez-S´ Sanchez, Carlos Flavi´ an "Enhancing the customer experience with virtual and augmented reality: The impact of content and device type" International Journal of Hospitality Management 98 (2021).