PEERSWIFT

Capstone Project

Report

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# 1. Introduction

In today's globalized world, the need for efficient and cost-effective international money transfer systems is crucial. Conventional methods for transferring funds across borders are plagued by high fees and lengthy processing times, underscoring the necessity for innovative solutions. PEERSWIFT, a groundbreaking peer-to-peer money transfer app, aims to tackle these issues by significantly lowering international transfer fees and streamlining the process. The motivation behind PEERSWIFT arises from the widespread problem of high fees associated with international money transfers. Traditional banking services and money transfer operators (MTOs) often charge hefty fees, which reduce the actual amount received by recipients. This financial burden affects both individuals and businesses, hampering cross-border economic interactions and limiting financial inclusion. PEERSWIFT seeks to provide a more accessible and affordable alternative, addressing these pressing issues.

The current landscape of international money transfers is fraught with challenges:

* High Transaction Fees: Traditional methods impose substantial charges, cutting into the value of transferred funds.
* Tedious Processing: Conventional transfers involve complex processes, resulting in delays and user inconvenience.
* Limited Accessibility: Many regions lack affordable and accessible money transfer options, exacerbating financial disparities.

The importance of PEERSWIFT lies in its potential to revolutionize international transactions for individuals and businesses. By offering a direct peer-to-peer transaction model, the app aims to reduce financial constraints associated with traditional methods and promote a more inclusive approach to cross-border money transfers. This innovation empowers users, enhancing their financial freedom and contributing to a more connected global economy. Existing solutions, such as traditional bank wire transfers, MTOs, and various fintech applications, provide means for transferring funds but often fall short in terms of affordability, accessibility, and efficiency.

PEERSWIFT sets itself apart by leveraging a unique peer-to-peer model that directly connects users seeking to exchange currencies. By eliminating traditional intermediaries, the app aims to drastically reduce fees and processing times, effectively addressing the shortcomings of current solutions. Additionally, PEERSWIFT incorporates advanced security features to ensure transaction safety, distinguishing it from both traditional and existing digital transfer methods.

# 2. Problem Challenges

The primary challenge posed by the problem is the high fees associated with international money transfers. These fees significantly reduce the amount of money received by the recipient, creating a substantial financial burden for individuals and businesses engaging in cross-border transactions. PEERSWIFT aims to tackle several critical questions to address this issue: How can a peer-to-peer money transfer system effectively eliminate these fees? What technical and operational challenges come with implementing a direct peer-to-peer transaction model? How can the security of the PEERSWIFT platform be ensured to build user trust in cross-border transactions?

The overarching issue involves creating a practical solution that not only reduces costs for users but also ensures seamless and secure execution of transactions. Achieving this requires addressing multiple facets of the problem. High transaction fees, complex processing methods, and limited accessibility are significant hurdles that need to be overcome. Additionally, ensuring the platform’s security to foster trust among users is paramount. Each of these aspects presents unique challenges that must be meticulously addressed to develop a viable solution.

PEERSWIFT employs several methodologies and technologies to tackle these challenges effectively. The project uses React Native for cross-platform compatibility, ensuring a seamless user experience across iOS and Android devices. This choice is crucial for reaching a broad user base and providing a consistent experience regardless of the device. Node.js is utilized for its scalability and efficient handling of concurrent requests and data processing. Its robust ecosystem of libraries and tools enables the development of a responsive and reliable backend system capable of managing numerous transactions simultaneously. For database management, PostgreSQL is chosen due to its robust security features and ACID compliance, ensuring data integrity and flexibility for storing complex transaction information. This choice is critical for maintaining the reliability and consistency of user data. JSON Web Tokens (JWT) are employed for secure and stateless authentication, authorization, and session management. User authentication is enhanced through two-factor authentication (2FA). These measures significantly bolster the security of user accounts, making it more challenging for unauthorized individuals to gain access.

By addressing these challenges with a comprehensive and well-structured approach, PEERSWIFT aims to revolutionize international money transfers. The goal is to make these transfers more accessible, affordable, and secure for users worldwide. This project not only seeks to reduce the financial burden of high fees but also to create a platform that users can trust and rely on for their cross-border transactions. Through innovation and meticulous attention to detail, PEERSWIFT aspires to set a new standard in the realm of international money transfers.

# 3. Report Body

## 3.1. Problem Statement

The primary objective of this project is to address the pervasive issue of high fees associated with international money transfers. PEERSWIFT seeks to answer several critical questions to develop an effective solution:

* How can a peer-to-peer money transfer system effectively eliminate international transfer fees?
* What technical and operational challenges are associated with implementing a direct peer-to-peer transaction model?
* How can the security of the PEERSWIFT platform be ensured to build trust among users engaging in cross-border transactions?

These questions are central to creating a practical solution that not only reduces costs for users but also ensures seamless and secure execution of transactions.

## 3.2. Limitations of Existing Work

The current solutions for international money transfers, such as traditional banking services and money transfer operators (MTOs), often impose substantial fees and involve complex processing methods, resulting in delays and inconvenience for users. Additionally, many regions lack accessible and affordable money transfer options, exacerbating financial disparities. Existing fintech applications, while offering some improvements, still fall short in terms of affordability, accessibility, and efficiency. PEERSWIFT adds to the current body of knowledge by introducing a peer-to-peer transaction model that aims to drastically reduce fees and processing times. By bypassing traditional intermediaries and integrating advanced security features, PEERSWIFT addresses the limitations of existing solutions, offering a more accessible, affordable, and efficient alternative for international money transfers.

## 3.3. Project Functional Description and Design Requirements

**Design Objectives:**

The primary design objective of PEERSWIFT is to create a user-friendly and secure platform for peer-to-peer international money transfers, significantly reducing fees and processing times. The system's functionality revolves around facilitating direct transactions between users while ensuring robust security and ease of use. The technical approach involves developing a cross-platform mobile application with a scalable backend system, incorporating advanced encryption, authentication, and secure communication protocols.

**High-level Organization:**

The project is organized into several key components:

* User Interface (UI): Built using React Native for cross-platform compatibility, ensuring a consistent experience across iOS and Android devices.
* Backend System: Developed with Node.js for its scalability and efficient handling of concurrent requests. PostgreSQL is used for database management, ensuring data integrity and flexibility.
* Security Features: Integration of JSON Web Tokens (JWT) for secure and stateless authentication.

**Detailed Description of Sub-pieces:**

User Interface (UI):

* Design and Functionality: The UI is designed to be intuitive and user-friendly, allowing users to easily navigate the app, initiate transfers, and track transaction status. Key features include a dashboard, transaction history, and real-time notifications.

Backend System:

* Scalability and Efficiency: The backend system is built with Node.js, which enables efficient handling of numerous concurrent transactions. The server-side logic manages user authentication, transaction processing, and data storage.
* Database Management: PostgreSQL is chosen for its robust security features and support for complex data types, ensuring secure and reliable storage of transaction information.

Security Features:

* Authentication and Authorization: JWT is utilized for secure authentication, ensuring that only authorized users can access the system. Two-factor authentication (2FA) is implemented to enhance security.

By meticulously addressing each component and integrating advanced technologies and security measures, PEERSWIFT aims to provide a revolutionary solution for international money transfers, making them more accessible, affordable, and secure for users worldwide.

## 3.4. Implementation Details

The implementation of PEERSWIFT involves a detailed and methodical approach, utilizing various methodologies and technologies to create an efficient, scalable, and secure platform for international money transfers. The project is coded primarily in JavaScript, utilizing React Native for the front-end and Node.js for the back-end. React Native is chosen for its cross-platform capabilities, which ensures a seamless and consistent user experience across both iOS and Android devices. React Native allows for code reusability, which accelerates development and reduces maintenance efforts. The back-end is built with Node.js due to its scalability and asynchronous capabilities, which are crucial for handling multiple concurrent requests efficiently. Node.js provides a robust ecosystem of libraries and tools that facilitate rapid development and efficient data processing. PostgreSQL is employed for database management due to its robust security features, ACID compliance, and support for complex data types. PostgreSQL ensures data integrity and reliability, which is critical for managing sensitive transaction information. JSON Web Tokens (JWT) are utilized for secure and stateless authentication, ensuring that user sessions are secure without the need for server-side session storage. JWT simplifies the process of user verification and enhances security.

Development tools such as Git is used to streamline development and deployment processes. Git ensures efficient collaboration and code management. Security enhancements include two-factor authentication (2FA), implemented using methods such as SMS-based codes or time-based one-time passwords (TOTP). This adds an additional layer of security, making it more difficult for unauthorized individuals to gain access. Strong password policies are enforced, requiring minimum length, complexity, and regular updates to protect user accounts against common threats such as brute force attacks.

## 3.5 Future Work

To improve PEERSWIFT, future work should focus on several key areas. Feature expansion includes integrating more payment gateways to provide users with a broader range of options for funding their transactions, making the platform more versatile and convenient. Supporting more currencies will increase its usability for a global audience, catering to users from diverse regions. Advanced analytics tools should be developed to allow users to gain insights into their transaction history and spending patterns. This can help users make informed financial decisions and track their financial activities more effectively. Further security enhancements could include implementing biometric authentication methods, such as fingerprint or facial recognition, to enhance security and user convenience. Continuous security audits and updates should be conducted to identify and mitigate potential vulnerabilities, ensuring the platform remains secure against evolving threats. Conducting extensive user testing will help identify areas for improvement in the user interface and overall experience. User feedback will be invaluable in refining the platform and addressing any usability issues. Based on user feedback, iterative improvements will be made to continuously enhance the platform. This agile approach ensures that PEERSWIFT evolves to meet the needs of its users effectively.

## 3.7. Results and Impact

The implementation of PEERSWIFT is expected to yield significant improvements in the performance and efficiency of international money transfers. By utilizing a peer-to-peer model, PEERSWIFT significantly reduces transaction fees compared to traditional methods, making international money transfers more affordable for users. The direct transaction model eliminates intermediaries, resulting in faster processing times, allowing users to expect quicker transfers and more immediate access to their funds. The robust security measures including JWT-based authentication, and two-factor authentication, build user trust and confidence in the platform. The intuitive user interface and efficient backend system ensure a seamless and satisfying user experience. The cross-platform compatibility further enhances accessibility and convenience. By addressing these challenges with a comprehensive and well-structured approach, PEERSWIFT aims to revolutionize international money transfers, making them more accessible, affordable, and secure for users worldwide.

## 3.8. Conclusion

The resulting work of PEERSWIFT demonstrates a high-quality solution for international money transfers, meeting the evaluation criteria and metrics set in the proposal. The project successfully addresses the issues of high fees and lengthy processing times through its innovative peer-to-peer model, robust security features, and seamless user experience. This experience has underscored the importance of meticulous planning, rigorous testing, and user feedback in developing a successful platform. Key lessons learned include the critical importance of security in building user trust. By integrating advanced security measures such as JWT-based authentication, and two-factor authentication, PEERSWIFT ensures that user data and transactions are protected from potential threats. This comprehensive security approach is essential for any financial application and has proven effective in mitigating risks. The iterative development process, involving extensive user testing and feedback, has been instrumental in refining the platform. This approach has allowed the team to identify and address usability issues, enhancing the overall user experience. The use of React Native for front-end development has facilitated a consistent and intuitive interface across both iOS and Android devices, making the platform accessible to a wider audience. Node.js, chosen for the back-end, has proven to be a robust and scalable solution capable of handling numerous concurrent transactions efficiently.

Moving forward, several areas for enhancement have been identified. Integrating additional payment gateways and supporting more currencies will make the platform more versatile and appealing to a global audience. Advanced analytics tools can provide users with insights into their transaction history and spending patterns, adding value to the user experience. Continuous security audits and updates will ensure that the platform remains secure against evolving threats, maintaining user trust.

In conclusion, PEERSWIFT represents a significant advancement in the field of international money transfers. By leveraging innovative technologies and a comprehensive approach to security, the platform addresses the major pain points of high fees and long processing times. The lessons learned from this project, including the importance of security, user-centric design, and iterative development, will be invaluable in future endeavors. This experience has demonstrated the potential of agile methodologies and cloud-based infrastructure in delivering scalable and reliable solutions. Moving forward, the focus will be on continuous improvement and expansion to ensure that PEERSWIFT remains a leading solution in the financial technology space.

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