

SYNOPSIS

Report on

TimeCoins: The Currency of Moments.

by

Aman Kumar 202410116100020

Anand Patel 202410116100023

Deepu Kumari 202410116100057

Session:2025-2026 (III Semester)

Under the supervision of

Ms. Hunny Gaur - Assistant professor

KIET Group of Institutions, Delhi-NCR, Ghaziabad



DEPARTMENT OF COMPUTER APPLICATIONS
KIET GROUP OF INSTITUTIONS, DELHI-NCR,
GHAZIABAD-201206
(2024 – 2026)

ABSTRACT

TimeCoins is an innovative platform that integrates instant messaging, digital currency transactions, and real-time notifications into a single, seamless system. It allows users to chat, share media, and securely transfer an in-app currency—TimeCoins—directly within conversations. The unique value proposition lies in the TimeCoins currency, whose value is dynamically tied to the organisation's share price, making it a blend of social interaction and financial engagement. The system leverages a modern technology stack including **React.js** for a responsive frontend, **Spring Boot** for a secure backend, **MySQL** for data storage, and **WebSockets** for real-time updates. With robust security measures like **JWT** authentication and HTTPS encryption, TimeCoins ensures both scalability and transaction safety. By merging communication and commerce, this platform aims to revolutionize how people connect, interact, and exchange value in real time.

The system architecture is built for high performance, security, and scalability, incorporating a React.js frontend for a responsive user interface, Spring Boot as the backend framework for robust business logic, MySQL for efficient data management, and WebSockets for real-time communication and push notifications. Security is prioritised with features such as JWT-based authentication, password encryption, secure API endpoints, and double-spend prevention mechanisms, ensuring safe and reliable transactions.

TimeCoins goes beyond the concept of a mere messaging app by enabling financial engagement in day-to-day interactions, allowing users to send coins with greetings, settle expenses in group chats, and receive instant notifications for value changes. Its limited coin supply, scarcity factor, and integration with share market performance create a unique incentive model that blends social networking with digital asset management.

Keywords: TimeCoins, instant messaging, digital currency, real-time notifications, in-app transactions, share value mapping, React.js, Spring Boot, MySQL, JWT authentication, WebSockets, secure payments, value fluctuation, seamless integration, financial engagement, blockchain-inspired currency.

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Introduction

The rapid evolution of digital technologies has redefined how people communicate, transact, and engage with financial systems. Traditional instant messaging applications focus solely on communication, while digital currency platforms remain isolated from everyday social interactions. This separation creates a gap between social connectivity and financial engagement. *TimeCoins* aims to bridge this gap by offering a unified platform that integrates instant messaging, digital currency transactions, and real-time notifications within a single, user-friendly environment.

TimeCoins introduces a unique in-app currency **TimeCoins** whose value is dynamically linked to the organisation's share price. This innovative approach not only enables seamless peer-to-peer transactions but also offers users the potential for value growth based on market performance and demand. Users can send coins directly while chatting, making financial exchanges as simple and natural as sending a message.

The platform's architecture leverages **React.js** for a responsive and modern frontend experience, **Spring Boot** for secure and efficient backend processing, **MySQL** for robust data management, and **Web Sockets** for real-time messaging and push notifications. Security is ensured through **JWT authentication**, password encryption, and secure API endpoints, protecting both communication and financial data.

By combining social interaction with economic value exchange, TimeCoins reimagines the role of messaging platforms. It transforms conversations into opportunities for meaningful, value-driven engagement, making it more than just a communication tool it becomes a complete ecosystem for connecting, transacting, and growing digital wealth.

Literature Review

Convergence of Messaging and Payments

The concept of integrating messaging with payment systems has been popularized by super apps like WeChat and WhatsApp Pay. WeChat has successfully evolved from a simple chat application to a multi-functional platform, offering services ranging from social media to mobile payments. WhatsApp Pay in India, built on the UPI framework, demonstrates how conversational payments can be scaled to millions of users while maintaining ease of use and high adoption rates. These cases show that embedding payments into messaging platforms can greatly enhance user engagement and retention.

Security and Privacy in Chat-Based Systems

Secure messaging relies heavily on encryption protocols to protect user communications. End-to-end encryption mechanisms, such as those used in leading messaging platforms, ensure that only intended recipients can read messages. For user authentication and authorization, JSON Web Tokens (JWT) have become a widely accepted standard, enabling stateless and secure communication between clients and servers. Combining encryption with secure authentication is crucial for platforms where financial transactions occur alongside personal messaging.

Digital Currency Design and Equity Linkage

Digital currencies and tokenized assets have evolved to include models such as stablecoins, which are backed by fiat or other assets, and tokenized securities, which represent ownership of real-world financial instruments. Linking a currency's value to the performance of a company's shares offers a novel approach, blending investment potential with daily usability. Such an approach combines the scarcity and demand-driven valuation of cryptocurrencies with the tangible backing of traditional equity markets.

Real-Time Interaction and Notifications

Real-time communication technologies like Web Sockets enable instant delivery of messages, transaction updates, and price change alerts. Push notification systems further enhance user experience by ensuring that important updates such as incoming payments or fluctuations in asset value are delivered instantly, keeping users engaged and informed.

Double-Spend Prevention in Digital Transactions

One of the key challenges in digital currency systems is preventing double spending, where the same digital asset is spent more than once. Various prevention techniques, including transaction validation and secure ledger systems, have been developed to address this issue. Implementing such measures within a chat-based payment ecosystem ensures the integrity and reliability of transactions.

Growth of Digital Payments in India

The increasing adoption of digital payment systems in India, particularly through platforms like UPI, reflects a growing comfort with cashless transactions. This environment provides fertile ground for the introduction of integrated messaging-payment platforms, combining the convenience of instant communication with secure and efficient currency exchange.

Research Gap

While the integration of messaging and payments is well established, there is limited research and practical implementation of a chat-native currency whose value is algorithmically linked to an organisation's share price. This presents an opportunity to explore a unique economic model that combines instant communication, real-time payments, and equity-driven currency valuation—forming the foundation of the TimeCoins platform.

Conclusion

Existing studies show the success of integrating messaging with payments, the effectiveness of secure communication protocols, and the potential of asset-linked digital currencies. While these technologies are well developed individually, there is limited work on combining them into a single platform with a currency tied to an organisation's share value. The TimeCoins platform addresses this gap by merging instant messaging, secure in-app payments, and equity-linked currency in one system.

Project Objective

The primary objective of the *TimeCoins* project is to design and develop an integrated platform that combines instant messaging, secure digital currency transactions, and real-time notifications into a single, seamless system. The project aims to introduce an innovative in-app currency **TimeCoins** whose value is dynamically linked to the organisation's share price, creating a unique blend of social interaction and financial engagement.

Specific objectives include:

1. **Develop a real-time messaging system** with support for text, images, and videos.
2. **Implement secure in-app payments** allowing users to transfer TimeCoins directly within chats.
3. **Enable real-time notifications** for messages, transactions, and currency value fluctuations.
4. **Integrate a share-value mapping mechanism** to determine TimeCoins' market value.
5. **Ensure platform security** through JWT authentication, encrypted data transmission, and double-spend prevention.
6. **Design a scalable architecture** capable of supporting a large user base with minimal latency.
7. **Provide a seamless and intuitive user experience** for both communication and transactions.

Hardware and Software Requirements

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1. Hardware Requirements

- **Processor:** Intel Core i5 or higher (or equivalent)
- **RAM:** Minimum 8 GB (16 GB recommended for development)
- **Storage:** Minimum 256 GB SSD
- **Display:** 1366×768 resolution or higher
- **Network:** Stable internet connection with at least 5 Mbps bandwidth

2. Software Requirements

a) Development Environment

- **Frontend Framework:** React.js
- **Backend Framework:** Spring Boot (Java)
- **Database:** MySQL
- **WebSockets:** For real-time messaging and notifications
- **REST API:** For secure communication between frontend and backend

b) Security Tools

- JWT Authentication library
- HTTPS/SSL certificate for encryption

c) Development Tools

- Node.js & npm (for frontend build)
- Java JDK 17 or above
- MySQL Workbench
- IDEs: IntelliJ IDEA / Eclipse for backend, VS Code for frontend
- Postman (for API testing)
- Git (for version control)

d) Operating System

- Windows 10/11, macOS

e) Deployment Environment

- Cloud hosting platform (AWS / Azure / GCP) or on-premise server
- Docker (optional for containerized deployment)

Project Flow

The development of *TimeCoins* follows a structured methodology to ensure systematic progress, efficient resource utilization, and a high-quality end product. The process is outlined as follows:

1. Requirement Analysis

- Gather functional and non-functional requirements through brainstorming and feasibility study.
- Identify core features such as instant messaging, secure coin transactions, and real-time notifications.

2. System Design

- Create architectural diagrams for the frontend, backend, and database.
- Design UI/UX wireframes for a seamless user experience.
- Plan database schema to store user profiles, chat logs, transaction history, and coin value data.

3. Technology Selection

- Choose React.js for the frontend, Spring Boot for the backend, and MySQL for the database.
- Implement WebSockets for real-time communication and JWT for secure authentication.

4. Development Phase

- **Frontend Development:** Build responsive chat interface, payment UI, and notification panels.
- **Backend Development:** Implement REST APIs for authentication, messaging, payment processing, and coin value updates.

- **Integration:** Connect frontend with backend APIs and enable real-time updates.
- 5. **Security Implementation**
 - Add JWT authentication for user sessions.
 - Encrypt passwords and secure API endpoints with HTTPS.
 - Implement double-spend prevention for coin transactions.
- 6. **Testing & Validation**
 - Unit testing for individual modules.
 - Integration testing to ensure smooth interaction between frontend, backend, and database.
 - Performance testing for scalability and speed under heavy load.
- 7. **Deployment**
 - Deploy the application on a cloud platform (AWS/Azure/GCP).
 - Set up monitoring for performance, uptime, and security.
- 8. **Future Enhancements**
 - Mobile app integration.
 - AI-driven coin value predictions.
 - Multi-language support and group payment features.

Research Methodology

The *TimeCoins* project adopts an **iterative and user-centric research methodology** to ensure that the final system is secure, scalable, and meets the intended objectives. The methodology involves the following stages:

1. **Problem Identification & Objective Definition**
 - Identify the gap between existing messaging applications and integrated payment systems.
 - Define the project objective of creating a platform that merges instant messaging, real-time payments, and equity-linked currency.
2. **Literature Review**
 - Study existing platforms (e.g., WeChat, WhatsApp Pay) to understand integration strategies for messaging and payments.
 - Review digital currency models, encryption protocols, and share-value mapping mechanisms.
3. **Requirement Gathering**

- Collect functional requirements such as messaging, payment transfer, and notifications.
 - Determine non-functional requirements including security, performance, and scalability.
- 4. System Design**
- Create high-level and low-level architecture diagrams.
 - Develop database schemas for storing user, transaction, and currency data.
 - Plan security measures like JWT authentication and HTTPS encryption.
- 5. Technology Selection**
- Choose React.js for the frontend, Spring Boot for backend services, MySQL for database management, and WebSockets for real-time features.
- 6. Prototype Development**
- Build an initial version of the system focusing on core messaging and payment features.
 - Implement a basic coin value fluctuation model linked to share prices.
- 7. Implementation**
- Develop the full application integrating messaging, payments, notifications, and security.
 - Optimize the system for speed and cross-platform compatibility.
- 8. Testing & Validation**
- Conduct unit, integration, and performance testing.
 - Perform security testing to prevent vulnerabilities such as double-spending or unauthorized access.
- 9. Deployment**
- Host the system on a cloud platform for scalability.
 - Monitor system performance and user feedback.
- 10. Evaluation & Enhancement**
- Assess the system against initial objectives.
 - Implement future enhancements such as AI-driven coin value predictions and multi-language support.

Project Outcome

The *TimeCoins* project is expected to deliver the following outcomes:

1. Integrated Communication and Payment Platform

- A functional web-based application that combines instant messaging, secure digital currency transactions, and real-time notifications into a single user-friendly interface.

2. Equity-Linked Digital Currency

- An in-app currency (TimeCoins) whose value dynamically fluctuates based on the organisation's share price, offering users a unique blend of communication and financial engagement.

3. Secure and Reliable Transactions

- Implementation of robust security mechanisms including JWT authentication, HTTPS encryption, and double-spend prevention to ensure safe and trustworthy payments.

4. Real-Time User Experience

- Instant updates for messages, payments, and currency value changes through WebSocket-powered push notifications.

5. Scalable and Modular Architecture

- A backend and frontend structure designed for easy scalability, allowing the system to handle a large and growing user base efficiently.

6. Foundation for Future Enhancements

- The platform will be designed to accommodate features like AI-based coin value prediction, mobile app integration, group payments, and multi-language support.

Overall Expected Impact:

The research will result in a unique platform that not only facilitates seamless communication but also transforms everyday interactions into opportunities for financial participation and value creation.

Proposed Time Duration

The *TimeCoins* project will be completed over a span of approximately **4 months** (16 weeks), divided into several phases to ensure structured development and timely delivery. The breakdown of each phase is as follows:

1. Phase 1: Requirement Gathering and Analysis (2 Weeks)

- **Duration:** 2 Weeks
- **Activities:**
 - Conduct research on existing messaging and payment platforms.
 - Identify user needs, system requirements, and project scope.
 - Finalize core features such as instant messaging, coin transfer, and real-time notifications.

2. Phase 2: System Design and Architecture (2 Weeks)

- **Duration:** 2 Weeks
- **Activities:**
 - Create wireframes and UI/UX mockups for the platform.
 - Design system architecture, including backend modules and database schema.
 - Define API endpoints, security protocols, and value fluctuation logic.

3. Phase 3: Frontend and Backend Development (6 Weeks)

- **Duration:** 6 Weeks
- **Activities:**
 - Develop the frontend using React.js for a responsive interface.
 - Implement backend services using Spring Boot and MySQL.
 - Integrate WebSockets for real-time messaging and notifications.
 - Implement JWT authentication and HTTPS encryption for secure operations.

4. Phase 4: Testing and Debugging (4 Weeks)

- **Duration:** 4 Weeks
- **Activities:**
 - Perform unit, integration, and performance testing.
 - Conduct security testing to prevent unauthorized access and double-spending.
 - Optimize system performance for scalability and low latency.

5. Phase 5: Deployment and Documentation (2 Weeks)

- **Duration:** 2 Weeks
- **Activities:**
 - Deploy the application on a cloud platform (AWS/Azure/GCP).
 - Prepare project documentation and final presentation.
 - Review feedback and apply minor improvements.

References

1. Alabdulwahhab, F. (2018). WeChat: China's integrated internet ecosystem. *International Journal of Computer Applications*, 182(5), 1–6. Retrieved from <https://doi.org/10.5120/ijca2018917161>
2. Gupta, R., & Jain, S. (2021). Adoption of mobile payment services in India: A study on UPI and WhatsApp Pay. *Journal of Payments Strategy & Systems*, 15(3), 205–216. Retrieved from <https://www.ingentaconnect.com/content/hsp/jpss/2021/00000015/00000003/art00005>
3. Diffie, W., & Hellman, M. E. (1976). New directions in cryptography. *IEEE Transactions on Information Theory*, 22(6), 644–654. Retrieved from <https://doi.org/10.1109/TIT.1976.1055638>
4. Rescorla, E. (2018). The Transport Layer Security (TLS) Protocol Version 1.3. *Internet Engineering Task Force (IETF) RFC 8446*. Retrieved from <https://datatracker.ietf.org/doc/html/rfc8446>
5. Jones, M., Bradley, J., & Sakimura, N. (2015). JSON Web Token (JWT). *Internet Engineering Task Force (IETF) RFC 7519*. Retrieved from <https://datatracker.ietf.org/doc/html/rfc7519>
6. Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. Retrieved from <https://bitcoin.org/bitcoin.pdf>
7. Mougayar, W. (2016). *The business blockchain: Promise, practice, and the application of the next Internet technology*. Wiley. Retrieved from <https://www.wiley.com/en-us/The+Business+Blockchain%3A+Promise%2C+Practice%2C+and+the+Application+of+the+Next+Internet+Technology-p-9781119300311>

8. Buterin, V. (2014). Ethereum white paper: A next-generation smart contract and decentralized application platform. Retrieved from <https://ethereum.org/en/whitepaper/>
9. Kuo, T., Kim, H., & Ohno-Machado, L. (2017). Blockchain distributed ledger technologies for biomedical and health care applications. *Journal of the American Medical Informatics Association*, 24(6), 1211–1220. Retrieved from <https://doi.org/10.1093/jamia/ocx068>
10. Chuen, D. L. K., Guo, L., & Wang, Y. (2017). Cryptocurrency: A new investment opportunity. *The Journal of Alternative Investments*, 20(3), 16–40. Retrieved from <https://doi.org/10.3905/jai.2017.20.3.016>