

# SecureCheque: A Blockchain-Driven Framework for Automated and Fraud-Resistant Cheque Clearance

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*Abstract- Even with the rise of fast digital payment systems, cheques have not disappeared from real-world financial use. They are still commonly used in situations where written authorization and delayed processing are required. However, the way these cheques are handled has remained mostly unchanged for years. The process usually moves through several steps involving different banking entities, and each step adds time and dependency. Because of this, completing a single cheque transaction can take longer than expected, especially when verification is done manually. A noticeable drawback in the current approach is how transaction information is stored and checked. Since records are maintained separately by different systems, there is no simple way to confirm the history of a cheque in one place. This makes it harder to detect if the same cheque data has already been used or slightly modified. In addition, users submitting cheques are often left without clear updates until the process is finished, which reduces visibility into what is happening in between. Instead of treating each transaction as an independent entry, the system described in this work connects records in a continuous sequence. Each new entry depends on the previous one, forming a structure where earlier data cannot be quietly changed without affecting what comes after it. A hash value is created for every record so that even a small change produces a different outcome, making inconsistencies easier to notice. The system accepts cheque details through a simple interface and checks whether similar information already exists before allowing it to be recorded. If the data is found to be repeated or inconsistent, it is not accepted. Otherwise, it becomes part of the sequence. This avoids unnecessary duplication and keeps the stored data consistent over time. Since all entries are linked, reviewing past transactions becomes more straightforward. Testing with different inputs showed that the system responds quickly and produces consistent results. The need for repeated manual verification is reduced, and the structure of stored data makes checking easier. While the current version focuses on basic validation and recording, it can be extended to work alongside existing banking processes. This approach does not try to completely replace current cheque systems but instead improves how transaction data is handled and verified. By organizing records in a connected manner and*

*reducing reliance on manual checks, it offers a more reliable and transparent way to manage cheque clearance.*

## I. INTRODUCTION

Financial systems have changed significantly with the introduction of digital technologies, yet certain traditional methods continue to remain in use due to their practical advantages. Cheques are one such method that still plays a role in many formal and institutional transactions. They are often preferred in situations where written authorization, traceability, or delayed settlement is required. Even though faster alternatives exist today, the continued use of cheques shows that they still serve a purpose that has not been fully replaced by modern payment systems.

The process used to handle cheque transactions, however, has not progressed at the same rate as other financial technologies. In most cases, cheque clearance involves multiple stages that are carried out across different systems and organizations. A cheque is submitted, verified, forwarded for approval, and finally settled after confirmation. Each stage depends on coordination between entities that may not operate simultaneously, which increases the overall time required to complete the transaction. This delay becomes more noticeable when the cheque involves different banks, as additional steps are introduced to ensure correctness.

Verification within this process often depends on manual inspection. Tasks such as checking signatures, confirming account details, and validating transaction information are commonly performed by individuals rather than automated systems. While this approach has been used for a long time, it introduces inconsistency because results may vary depending on who performs the verification. In situations where large numbers of cheques are processed, this reliance

on manual effort can also slow down the system and increase the likelihood of errors.

Another limitation is the lack of clear visibility during processing. Once a cheque is submitted, users usually do not receive detailed updates about its progress until the final outcome is available. This makes it difficult to understand whether the cheque is under verification, delayed, or rejected at an intermediate stage. From a broader perspective, this limited transparency reduces confidence in the system and makes it less user-friendly.

The way transaction data is stored also contributes to inefficiencies. Information related to cheque processing is typically maintained in separate systems managed by different institutions. Since these records are not directly connected, verifying consistency across them requires additional effort. This separation makes it harder to identify repeated or altered entries quickly, especially when transactions are handled across multiple organizations. As a result, maintaining accuracy and preventing duplication becomes more challenging.

To improve this situation, it becomes necessary to rethink how transaction data is handled rather than only focusing on speeding up individual steps. One possible direction is to organize records in a way that allows them to be verified collectively instead of independently. When data is connected and structured properly, it becomes easier to track changes, confirm authenticity, and reduce repeated checks. This shift in approach focuses on improving the reliability of the system without making it overly complex.

The system discussed in this work follows this idea by storing cheque transactions in a linked format, where each entry is associated with the one before it. This creates a continuous sequence of records in which any modification to earlier data affects the structure that follows. A hashing method is used to generate a unique value for each record, making it easier to detect inconsistencies if changes occur. By organizing data in this manner, the system reduces the chances of unnoticed alterations and improves the overall clarity of transaction history.

Instead of replacing existing cheque usage, the focus is on improving how transactions are recorded and verified. The approach aims to reduce delays, minimize dependency on repeated manual checks, and provide better visibility into the process. At the same time, it maintains a level of simplicity that allows it to be implemented without requiring extensive changes to existing workflows.

By addressing issues related to processing time, data consistency, and transparency, the proposed approach offers a more structured way to handle cheque transactions. It provides a balance between maintaining traditional practices and introducing improvements that make the system more reliable and efficient in real-world scenarios.

## II. LITERATURE SURVEY

### *A. Traditional Cheque Processing Methods*

Earlier cheque processing systems were designed around structured procedures followed by banks and financial institutions. These systems involve multiple stages such as submission, verification, interbank communication, and final settlement. Each stage is handled separately, and the entire process depends on coordination between different entities. While this approach ensures that transactions are handled carefully, it also increases the time required to complete the process.

Many institutions continue to use these methods because they are well-established and legally accepted. However, they are not optimized for speed or scalability. When the number of transactions increases, delays become more noticeable. This is especially true when cheques are processed across different banks, as additional verification steps are required.

Another important limitation is the reliance on manual verification. Bank officials are responsible for checking signatures, validating account details, and confirming transaction information. Since these checks depend on human judgment, the results may not always be consistent. In high-volume environments, this also increases the chances of errors and slows down the overall system.

In addition, transaction records are maintained separately by different institutions. This makes it difficult to quickly verify the history of a cheque or detect duplicate entries. As a result, traditional systems provide structure but lack efficiency and transparency.

#### *B. Digitized Cheque Processing Systems*

To improve the efficiency of cheque handling, many systems have introduced digital processing methods. Instead of physically transferring cheques, scanned images and electronic data are used for verification and communication. This reduces the need for physical movement and speeds up certain parts of the process.

Digitized systems allow banks to process cheque information more quickly and reduce manual workload. Basic details such as cheque number and amount can be extracted automatically, which improves consistency in some cases. This approach also enables faster sharing of information between institutions.

However, these systems still depend on centralized storage and predefined rules. When the system cannot verify certain details, manual intervention is still required. This limits the level of automation and can reintroduce delays. The effectiveness of these systems also depends on the quality of scanned images and the accuracy of extracted data.

Another drawback is that digitization does not fully solve issues related to data consistency. Since records are still maintained separately, verifying whether a cheque has already been processed can be difficult. This means that while digitized systems improve speed, they do not completely address reliability and transparency concerns.

#### *C. Centralized Transaction Processing Systems*

Modern banking systems often rely on centralized platforms to manage transactions. These platforms store data in a single controlled environment, allowing institutions to coordinate activities more efficiently. Compared to traditional methods, centralized systems provide faster communication and better organization of data.

One advantage of centralized systems is that transaction records are maintained in a structured manner, making it easier to perform validation and monitoring. This helps reduce inconsistencies and improves operational control. Banks can process transactions more quickly because data is available in one place.

Despite these benefits, centralized systems introduce dependency on a single authority. If the central system experiences technical issues or delays, it can affect all ongoing transactions. This creates a bottleneck and reduces system reliability. Another limitation is restricted transparency. Users do not have direct access to transaction details and must rely on the system for updates. This reduces visibility and makes it difficult for users to independently verify the status of their transactions.

Therefore, while centralized systems improve efficiency, they do not fully eliminate concerns related to trust and system dependency.

#### *D. Blockchain-Based Financial Systems*

Recent developments in distributed systems have introduced blockchain as an alternative way to manage transaction data. In this approach, records are stored in a connected sequence where each entry depends on the previous one. This structure makes it difficult to modify existing data without affecting the entire sequence.

Blockchain systems allow multiple participants to access and verify the same set of records without relying on a central authority. This improves transparency and reduces dependency on a single controlling entity. Each transaction is secured using a hashing mechanism, which helps in detecting any changes in data.

In financial applications, blockchain has been explored for improving transaction tracking and reducing fraud. The ability to maintain a consistent and shared record makes it suitable for systems where verification is important.

However, implementing blockchain requires careful design. Issues such as performance, scalability, and integration with existing systems need to be

considered. Without proper planning, the system may become complex or inefficient.

Even with these challenges, blockchain provides a strong foundation for improving how financial transactions are recorded and verified.

#### *E. Need for an Improved Cheque Clearance Approach*

From the discussion above, it is clear that each existing approach has its own strengths and limitations. Traditional systems provide reliability but are slow and dependent on manual effort. Digitized systems improve speed but still rely on centralized control. Centralized platforms enhance coordination but introduce dependency and limited transparency.

Blockchain-based approaches offer improvements in data integrity and visibility, but their use in cheque processing is still limited. Most existing systems do not fully address the specific challenges associated with cheque clearance.

This creates a need for a system that combines structured processing with improved data handling. The aim is to reduce delays, prevent duplicate transactions, and provide better visibility without increasing complexity.

The proposed system addresses this need by organizing cheque transactions in a connected and verifiable format. By focusing on simplicity and consistency, it provides a practical improvement over existing methods while remaining suitable for real-world use.

### III. METHODOLOGY

#### *A. System Overview*

The proposed system is designed to simplify cheque clearance by organizing transaction data in a structured and verifiable manner. Instead of relying heavily on repeated manual checks, the system focuses on creating a connected record of transactions that can be validated efficiently. The overall workflow moves from user input to validation, followed by secure record creation and storage.

The design follows a layered approach where different components handle specific responsibilities. This separation ensures that the system remains easy to manage while maintaining clarity in its operation. Each step in the process contributes to improving consistency and reducing delays.

#### *B. Data Input and Initial Validation*

The process begins when the user enters cheque details through a web interface. The required information includes cheque number, account details, transaction amount, and timestamp. The interface is kept simple to ensure ease of use and reduce the chances of incorrect input.

At this stage, the system performs basic validation to check whether all required fields are filled and whether the values fall within acceptable limits. Invalid or incomplete entries are rejected immediately to prevent incorrect data from moving forward in the process.

#### *C. Duplicate Detection Mechanism*

Once the input is validated, the system checks whether the same cheque information already exists. This step is important to prevent duplicate processing. The system compares the new entry with previously stored records rather than treating it as an independent transaction.

If a matching record is found, the transaction is not accepted. This ensures that repeated or reused cheque data does not enter the system. By handling duplication at an early stage, the system avoids unnecessary processing and maintains consistency.

#### *D. Record Generation and Hashing*

After passing the duplication check, a new record is created. The system combines the cheque data with additional elements such as the current timestamp and a reference to the previous record. This combined data is then processed to generate a unique identifier.

A hashing method is used to create this identifier, ensuring that each record has a distinct value. Even a small change in the data produces a different result, which helps in detecting any form of alteration. This step plays a key role in maintaining data integrity.

#### *E. Linked Record Structure*

The generated record is added to a sequence of existing records, forming a connected structure. Each entry is linked to the one before it, creating a continuous chain. This design ensures that changes in earlier records cannot occur without affecting subsequent entries.

Because of this linkage, any inconsistency becomes noticeable during verification. This reduces the need for repeated manual checks and strengthens the reliability of the system.

#### *F. Integrity Verification*

Before accepting a new record, the system verifies whether the existing sequence remains consistent. This step ensures that no unauthorized changes have been made to previously stored data. If any irregularity is detected, the system can stop further processing until the issue is resolved.

This continuous verification helps maintain trust in the system and ensures that all stored data remains accurate over time.

#### *G. Data Storage and Access*

In addition to the linked record structure, the system uses a database to store transaction details for quick access. This allows users and administrators to retrieve information without scanning the entire sequence of records.

The combination of structured storage and linked records provides both efficiency and reliability. It ensures that data can be accessed easily while still maintaining integrity.

#### *H. System Architecture*

The system is divided into three main components: the frontend, backend, and record management layer. The frontend handles user interaction, the backend manages validation and processing logic, and the record layer ensures data consistency. This separation allows each part of the system to function independently while contributing to the overall workflow. It also makes the system easier to maintain and extend in future improvements.

#### *I. Overall Working Principle*

The methodology focuses on reducing dependency on manual verification while improving the organization of transaction data. By combining validation, duplication checks, and linked record storage, the system ensures that each transaction is handled in a consistent and reliable manner.

The approach avoids unnecessary complexity and instead emphasizes clarity and efficiency. This makes the system suitable for practical use while still addressing key challenges in cheque clearance.

## IV. RESULTS AND DISCUSSION

#### *A. Testing Approach and Setup*

To evaluate the proposed system, a series of test cases was created to represent different types of cheque transactions. Since the system does not depend on large external datasets, testing focused on manually designed inputs that reflect realistic scenarios. These included valid cheque entries, duplicate submissions, incomplete data, and slightly modified inputs.

The main objective of testing was to observe how the system behaves under different conditions rather than relying on large-scale statistical evaluation. Each test case was processed through the system to verify whether validation, duplication detection, and record creation were functioning correctly.

The implementation was carried out in a web-based environment, where the frontend handled user interaction and the backend performed processing and validation. Multiple test runs were conducted to ensure that the system produced consistent outputs and maintained stability.

#### *B. Validation and Input Handling*

The initial stage of the system focuses on validating user input. During testing, it was observed that incomplete or incorrect data was effectively filtered out before entering deeper stages of processing. Inputs with missing fields or invalid values were rejected immediately.

This early validation step reduces unnecessary processing and ensures that only meaningful data is handled by the system. It also improves reliability, as

incorrect entries do not affect the integrity of stored records.

Another observation was that the validation process remained consistent across multiple runs. The same invalid inputs always produced the same result, indicating predictable system behavior. This consistency is important for building user confidence.

#### *C. Duplicate Detection Performance*

The system's ability to detect duplicate entries was tested by submitting identical cheque data multiple times. It was observed that previously recorded transactions were successfully identified, and duplicate entries were not accepted.

Tests were also performed with minor changes in input values to observe system behavior. Even small variations resulted in new records being created, as the system treats each unique input as a separate transaction. This behavior ensures that only exact duplicates are rejected.

By preventing repeated entries, the system maintains the uniqueness of transactions and avoids unnecessary processing. This improves efficiency and reduces the possibility of errors.

#### *D. Record Generation and Consistency*

After passing validation and duplication checks, the system generates a new record for each transaction. Each record includes a unique identifier along with a reference to the previous entry, ensuring continuity.

During testing, it was observed that the generated identifiers changed whenever there was a variation in input data. This confirms that the hashing mechanism is sensitive to changes and can effectively distinguish between different transactions. The structure of records remained consistent throughout all test cases. Each new entry was correctly linked to the previous one, maintaining a continuous chain of data. This shows that the system is capable of preserving structural integrity over time.

#### *E. Integrity of Stored Data*

Maintaining data integrity is a key aspect of the system. The linked structure of records ensures that any change in earlier data would affect subsequent

entries. Although direct modification is not allowed in the system, this property was analyzed conceptually during testing.

The design ensures that once a record is added, it cannot be altered without disrupting the entire sequence. This makes unauthorized changes easy to detect and strengthens trust in the stored data.

This approach reduces the need for repeated manual verification and provides a reliable way to maintain consistency across transactions.

#### *F. System Response Time*

The system was observed to perform efficiently in terms of response time. Since the methodology avoids complex computations, most operations such as validation and record creation were completed quickly.

Users receive immediate feedback after submitting data, which improves interaction and usability. The consistent response time across multiple tests indicates that the system performs reliably under normal conditions.

This efficiency makes the system suitable for real-time applications where quick processing is required.

#### *G. Usability and Practical Considerations*

From a usability perspective, the system is simple and easy to operate. The interface allows users to input cheque details without confusion, and the outputs are presented clearly.

Unlike complex systems that require extensive input or technical knowledge, this approach keeps interaction minimal. This increases accessibility and makes the system more practical for everyday use.

Another advantage is that the system does not require continuous data collection. Each transaction is processed independently while still maintaining a connected record structure. This balance improves both usability and performance.

#### *H. Comparison with Existing Methods*

When compared to traditional cheque processing systems, the proposed approach reduces delays by

minimizing manual intervention. Transactions can be processed more quickly without waiting for multiple stages of verification.

In comparison to digitized systems, the proposed method improves consistency by linking records together. This reduces the chances of duplicate processing and improves traceability. Compared to centralized systems, the approach reduces dependency on a single controlling entity. The structured record system ensures consistency without relying entirely on one authority.

Overall, the system provides a balanced improvement by combining efficiency, reliability, and simplicity.

#### *I. Limitations and Future Scope*

Despite its advantages, the system has certain limitations. Since it is based on predefined validation rules, it may not handle highly complex or unusual scenarios. Additional mechanisms may be required for more advanced verification.

Another limitation is the lack of direct integration with real banking systems. Extending the system to work with existing infrastructure would improve its practical application.

Future improvements may include enhancing scalability, introducing automated decision mechanisms, and improving user interaction features. These additions can strengthen the system while maintaining its simplicity.

## V. CONCLUSION

The work presented in this paper focuses on improving the way cheque transactions are handled by addressing limitations found in existing systems. Instead of redesigning the entire financial process, the approach concentrates on organizing transaction data in a more structured and reliable manner. By doing so, it becomes possible to reduce delays, improve consistency, and make verification easier without introducing unnecessary complexity.

One of the main outcomes of this system is the reduction in dependency on manual verification. Traditional cheque processing relies heavily on

repeated human checks, which can slow down operations and introduce variability. The proposed method reduces this dependency by applying validation and structured data handling, ensuring that only valid and unique transactions are recorded.

Another important contribution is the prevention of duplicate entries. By comparing new transaction data with existing records before acceptance, the system ensures that repeated processing of the same cheque does not occur. This improves accuracy and helps maintain a clean and reliable transaction history.

The use of a linked record structure adds an additional layer of consistency. Since each record is connected to the previous one, any change in earlier data would affect the entire sequence. This makes unauthorized modifications easier to identify and strengthens trust in the stored information. As a result, the system provides a more dependable way of maintaining transaction records.

The overall design emphasizes simplicity and practicality. The system avoids heavy computational requirements and does not depend on large datasets or complex models. This makes it suitable for real-world applications where ease of use and efficiency are important. At the same time, it provides meaningful improvements over traditional methods by organizing data more effectively.

While the current implementation focuses on core functionality, there is scope for further development. Integrating the system with existing banking infrastructure can improve its applicability, and additional features can be introduced to handle more advanced scenarios. Enhancements in scalability and automation can further strengthen the system without compromising its simplicity.

In summary, the proposed approach offers a practical way to improve cheque clearance by combining structured data handling with efficient validation. It provides a balance between reliability and usability, making it a suitable step toward more consistent and transparent financial transaction systems.

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