

SECURE ATM COMMUNICATION PROTOCOL

GROUP MEMBERS

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LANGUAGES / FRAMEWORK

- Languages: C++ for core implementation
- Frameworks/Libraries: POSIX for command-line and networking functionalities, TCP, OpenSSL for cryptographic operations

ARCHITECTURE

- **Communication Flow**

- **Initialization:**

ATM Client and Bank Server establish a secure connection using the auth file.

- **Authentication:**

The ATM client sends encrypted credentials from the card file to the bank server.

The bank server verifies the credentials and confirms the client's identity.

- **Transaction Execution:**

The ATM client sends transaction requests (deposit, withdrawal, or balance inquiry) to the bank server.

The bank server processes the request, updates the account balance, and sends a confirmation response.

- **Termination:**

Once the transaction is complete, the ATM client and bank server securely close the connection.

- **Error Handling:**

Both ATM and bank must handle errors (e.g., protocol violations, timeouts) and take appropriate actions.

- **Components/Modules present in the design:**

- 1. Authentication Module:**

- Purpose: Ensures mutual authentication between the ATM and bank server and secures all communication between them.
- Components: Manages the authentication process and implements the secure protocol for message exchange.
- Security Considerations: Protects against unauthorized access and man-in-the-middle attacks through encryption and secure credential verification.
- Group Member working on this module: Ushasree & Saloni

- 2. Account Management Module:**

- Purpose: Manages creation, deletion, and maintenance of customer accounts.
- Components: Includes account creation, balance initialization, and card file generation for customers.
- Security Considerations: Protect account data and ensure that only authorized users can access or modify their accounts.
- Group Member working on this module: Sunandini

- 3. Transaction Processing Module:**

- Purpose: Processes all financial transactions securely between the ATM and bank server.
- Components: Handles transaction processing and ensures secure communication for each transaction.
- Security Considerations: Ensures transaction integrity and prevents unauthorized or tampered transactions.
- Group Member working on this module: Vedanshi & Vatsalraj

- 4. Error Handling Module:**

- Purpose: Manages errors during protocol execution, such as invalid inputs, timeouts, or communication failures.
- Components: Includes mechanisms for handling and logging errors, as well as rolling back transactions if necessary.
- Security Considerations: Ensure that errors do not leak sensitive information or allow protocol abuse.
- Group Member working on this module: Aditya

- 5. Command Line Interface (CLI) Module:**

- Purpose: Provides a user interface for customers to interact with the ATM program.
- Components: Parses command-line inputs, validates them, and passes them to the appropriate modules for processing.
- Security Considerations: Validate all user inputs to prevent command injection and other input-related attacks.
- This will act as the top module.
- Group Member working on this module: Vaibhavi Sharma

FUNCTIONALITIES

- **ATM Client:**
 - **User Interface:** Command-line interface to input transactions.
 - **Secure Communication:** Encrypts/decrypts messages using the **auth** file.
 - **Transaction Requests:** Handles deposit, withdrawal, and balance inquiry.
 - **Error Management:** Detects and responds to protocol errors, connection issues.

- **Bank Server:**
 - **Account Management:** Maintains and updates user account balances.
 - **Transaction Logging:** Records all transactions and errors.
 - **Secure Communication:** Authenticates and decrypts messages from **atm**.
 - **Error Handling:** Detects and manages protocol errors, timeouts.

REFERENCES

1. <https://www.onlinesbi.sbi/>
2. <https://www.hdfcbank.com/>
3. <https://www.icicibank.com/>