

Project Documentation

Subject : Network Communication in mobile application development

Project Topic : Mobile currency exchange system

1.General information

- Project Name : Currency Exchanger (Networkc)
- Project Author : Batbold Samdan
- Field of Study : Computer Science
- Year / Semester : 4th year , 7th semester
- Supervisor : Marcin Kacprowicz
- Submission date : 29 january 2026

2.Project Objective

The objective of this project is to design and implement a mobile currency exchange application that allows users to perform virtual currency transactions using in real-time and historical exchange rate data. The system integrates with the **National Bank of Poland (NBP) API** to ensure reliable and up-to-date currency information .

The project focuses on networking aspects in mobile systems , including REST-API communication , secure data transmission , external API integration , latency handling , and reliability in unstable network conditions.

2.1Project scope

The scope of the project includes:

- Secure user authentication using JWT tokens
- Digital wallet supporting multiple foreign currencies
- Real-time currency exchange (buy and sell operations)
- Historical exchange rate visualization
- PLN account funding and withdrawal
- Transaction history tracking
- Integration with external banking API (NBP)

3. Functional requirements

ID	requirement	Description
1	User registration	The system shall allow users to create an account using valid email and password
2	User authentication	The system shall authenticate users using JWT tokens
3	View exchange rates	The system shall retrieve real-time exchange rates from the NPB API
4	Buy currency	The system shall allow users to buy foreign currency using PLN balance
5	Sell currency	The system shall allow users to sell owned currency and receive PLN
6	Wallet management	The system shall display balances of all owned currencies
7	Historical rates	The system shall display historical exchange rate charts
8	Add funds	The system shall allow users to add PLN
9	Transaction History	The system shall store and display transaction history
10	Logout	The system shall securely terminate user session

3.2 Non-functional requirements

- Security
 - HTTPS communication
 - JWT-based authorization
 - Password hashing using bcrypt
- Performance
 - API response below 2 second
 - Efficient REST communication
- Reliability
 - Graceful handling of network/API failures
 - Error feedback to the user

4.UML diagrams

- Providing link to due lack of Image - [LINK](#)

4. DataBase Design

The application uses **MongoDB** to store application data.

4.1 DataBase collection

Users

- _id (ObjectId)
- email (String)
- password (String , hashed)
- balance (number)
- wallet (Array)

Transactions

- _id (ObjectId)
- userId (ObjectId)
- Type (BUY/SELL)
- FromCurrency (String)
- ToCurrency (String)
- Amount (number)
- Rate (number)
- CreatedAt (date)

Rates

- _id (ObjectId)
- Code (String)
- Currency (String)
- Mid (number)

5.System architecture

Frontend

- React-native with Expo
- Expo router for navigation

- Axios for HTTP communication
- React context for authentication state

Backed

- Node.js with Express.js
- REST-API endpoints
- JWT authentication middleware
- MongoDb database integration

External Services

- National Bank of Poland (NBP) API for exchange rates

6.Sources

- [National Bank of Poland API](#) documentation