Expense Tracker - System Requirements Specification (MVP)

Online version (Confluence):
https://igor-kudinov.atlassian.net/wiki/external/ZTgxN2NjMmFiZGY2NDI0NzhhMDJkNDljNGRkMTQyNDU

Online version (GitHub):
https://github.com/DigitLock/expense-tracker

1. Introduction

This System Requirements Specification (SRS) document provides detailed technical requirements for the **MVP (Minimum Viable Product)** version of the Expense Tracker system - a personal finance management application designed to enable comprehensive tracking and analysis of family financial flows.

Document Purpose

This document serves as the primary technical specification for MVP implementation, defining functional requirements, API specifications, user interface requirements, data models, and non-functional constraints that enable core family budget management functionality within a 1-month development timeline.

Scope

The SRS covers the MVP implementation with focus on essential functionality:

- **Core Functionality**: Income and expense tracking, basic account management, simple reporting
- **Technical Architecture**: Monolithic Go application with REST API and PostgreSQL database
- **Multi-Currency Support**: RSD as base currency with EUR display conversion (configurable base currency post-MVP)
- **User Management**: Simple family-based authentication with shared financial data
- **Data Management**: Basic transaction categorization, essential audit trail

Target Audience

- Software developer implementing the MVP
- Business stakeholder (Igor Kudinov) for requirement validation
- QA engineer for MVP testing specification

Related Documents

- **Business Requirements Document (BRD)**: Expense Tracker - Business Requirements Document v1.0
- **API Documentation**: Generated from code comments and examples in this SRS

Technology Stack (Simplified for MVP)

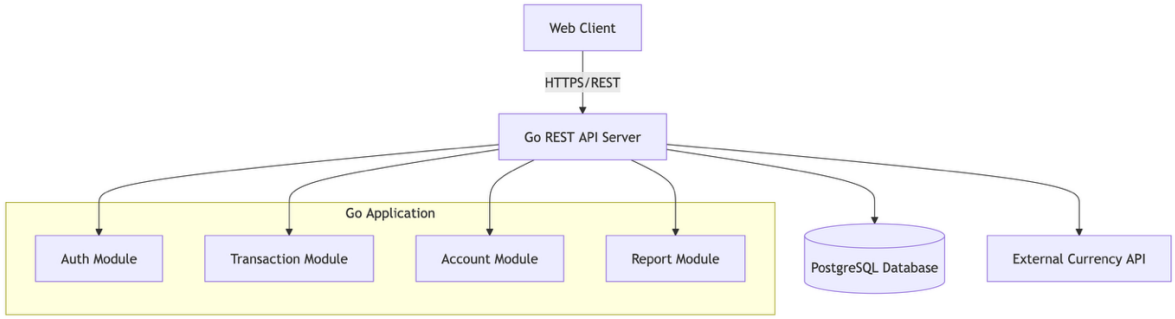
- **Backend**: Go (Golang) with REST HTTP API (single monolithic service)
- **Database**: PostgreSQL for data persistence
- **Web Frontend**: Vue.js with responsive design
- **Authentication**: JWT-based authentication with family context
- **Deployment**: Single Docker container
- **External APIs**: Currency exchange rate API for multi-currency support

2. Functional Requirements

2.1 API

2.1.1 Authentication System

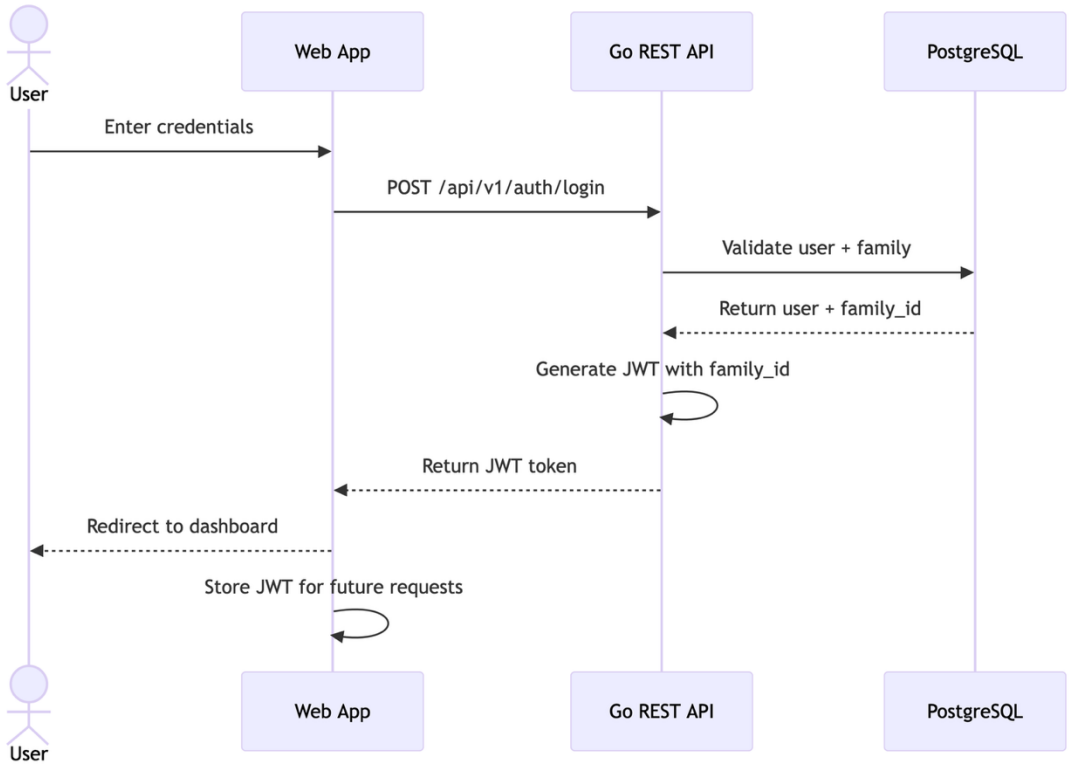
Components diagram



Mermaid code:

```
graph TB
    WC[Web Client] -->|HTTPS/REST| API[Go REST API Server]
    API --> DB[(PostgreSQL Database)]
    API --> EXT[External Currency API]
        subgraph "Go Application"
            AUTH[Auth Module]
            TRANS[Transaction Module]
            ACCOUNT[Account Module]
            REPORT[Report Module]
        end
    API --> AUTH
    API --> TRANS
    API --> ACCOUNT
    API --> REPORT
```

Sequence diagram



Mermaid code:

```
sequenceDiagram
    Actor User
    participant Web as Web App
    participant API as Go REST API
    participant DB as PostgreSQL

    User->>Web: Enter credentials
    Web->>API: POST /api/v1/auth/login
    API->>DB: Validate user + family
    DB-->>API: Return user + family_id
    API->>API: Generate JWT with family_id
    API-->>Web: Return JWT token
    Web-->>User: Redirect to dashboard
    Web->>Web: Store JWT for future requests
```

2.1.2 User Authentication

Description

Authenticates family members and provides JWT tokens with family context for accessing shared financial data.

Endpoint

`POST https://api.expensetracker.digitlock.systems/api/v1/auth/login`

Authorization

❎*No authorization required for login endpoint.*

Request parameters

Body parameter	Type	Required	Description	Example
email	String	Yes	User email address	igor@example.com
password	String	Yes	User password (plain text over HTTPS)	securePassword123

Request example:

```
POST https://api.expensetracker.digitlock.systems/api/v1/auth/login
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example:

```
{
    "email": "igor@example.com",
    "password": "securePassword123"
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	*See nested parameters below*
data.token	String	Yes	JWT authentication token for API access	eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9...
data.user	Object	Yes	Authenticated user information	See nested parameters below
data.user.id	String	Yes	Unique user identifier	user_123
data.user.email	String	Yes	User email address	igor@example.com
data.user.name	String	Yes	User display name	Igor Kudinov
data.user.family_id	String	Yes	Family identifier for data scoping	family_456
data.expires_in	Integer	Yes	Token expiration time in seconds	86400

Response body example:

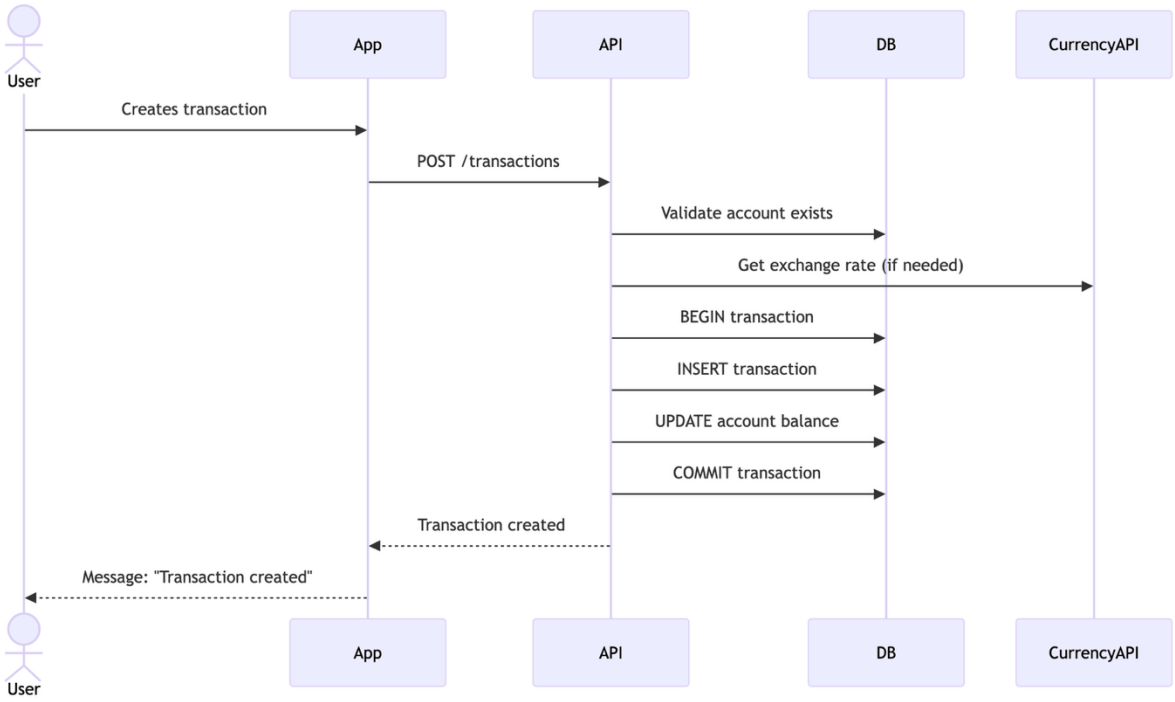

```
{
    "success": true,
    "data":
    {
        "token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9...",
        "user":
        {
            "id": "user_123",
            "email": "igor@example.com",
            "name": "Igor Kudinov",
            "family_id": "family_456"
        },
        "expires_in": 86400
    }
}
```


2.1.3 Transaction Management

Description

Core functionality for creating, reading, updating, and deleting family income and expense transactions.

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant App
    participant API
    participant DB
    participant CurrencyAPI

    User ->> App: Creates transaction
    App->>API: POST /transactions
    API->>DB: Validate account exists
    API->>CurrencyAPI: Get exchange rate (if needed)
    API->>DB: BEGIN transaction
    API->>DB: INSERT transaction
    API->>DB: UPDATE account balance
    API->>DB: COMMIT transaction
    API-->>App: Transaction created
    App -->> User: Message: "Transaction created"
```

Endpoints

```
POST https://api.expensetracker.digitlock.systems/api/v1/transactions
GET    https://api.expensetracker.digitlock.systems/api/v1/transactions
PATCH  https://api.expensetracker.digitlock.systems/api/v1/transactions/{id}
DELETE https://api.expensetracker.digitlock.systems/api/v1/transactions/{id}
```

Authorization

🔐 Bearer JWT token required. Family context extracted from token.

Request parameters - POST - *Create Transaction*:

Body parameter	Type	Required	Description	Example
type	String	Yes	Transaction type: "income" or "expense"	expense
amount	Number	Yes	Transaction amount (positive value)	2500.00
currency	String	Yes	Currency code (RSD or EUR)	RSD
category_id	String	Yes	Reference to transaction category	cat_groceries_123
account_id	String	Yes	Reference to account	acc_cash_456
description	String	No	Transaction description	Weekly groceries at Maxi
date	String	Yes	Transaction date (YYYY-MM-DD)	2025-10-30

Request example:

```
POST https://api.expensetracker.digitlock.systems/api/v1/transactions
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example:

```
{
    "type": "expense",
    "amount": 2500.00,
    "currency": "RSD",
    "category_id": "cat_groceries_123",
    "account_id": "acc_cash_456",
    "description": "Weekly groceries at Maxi",
    "date": "2025-10-30"
}
```

Response parameters

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true

Response body example:

```
{
  "success": true
}
```

Request parameters - GET - *List Transactions*:

Query parameter	Type	Required	Description	Example
type	String	No	Filter by transaction type: "income" or "expense"	expense
month	String	No	Filter by month (YYYY-MM)	expense
account_id	String	No	Filter by account	expense
include_inactive	Boolean	No	Include inactive records (default: false)	false

Request example:

```
GET ttps://api.expensetracker.digitlock.systems/api/v1/transactions?type=expense&month=2025-10
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.transactions	Array	Yes	List of transaction objects	See nested parameters below
data.transactions[].id	String	Yes	Unique transaction identifier	txn_789
data.transactions[].type	String	Yes	Transaction type: "income" or "expense"	expense
data.transactions[].amount	Number	Yes	Transaction amount in original currency	2500.00
data.transactions[].currency	String	Yes	Original transaction currency	RSD
data.transactions[].amount_base	Number	Yes	Amount converted to family base currency	2500.00
data.transactions[].base_currency	String	Yes	Family base currency	RSD
data.transactions[].category	Object	Yes	Transaction category information	See nested parameters below
data.transactions[].category.id	String	Yes	Category unique identifier	cat_groceries_123
data.transactions[].category.name	String	Yes	Category display name	Groceries
data.transactions[].category.type	String	Yes	Category type: "income" or "expense"	expense
data.transactions[].account	Object	Yes	Account information	See nested parameters below
data.transactions[].account.id	String	Yes	Account unique identifier	acc_cash_456
data.transactions[].account.name	String	Yes	Account display name	Cash RSD
data.transactions[].account.type	String	Yes	Account type: "cash", "checking", "savings"	cash
data.transactions[].description	String	No	Transaction description	Weekly groceries at Maxi
data.transactions[].date	String	Yes	Transaction date (YYYY-MM-DD)	2025-10-30
data.transactions[].created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-30T14:30:00Z
data.transactions[].created_by	String	Yes	User who created the transaction	Igor Kudinov
data.pagination	Object	Yes	Pagination information	See nested parameters below

data.pagination.page	Integer	Yes	Current page number	1
data.pagination.per_page	Integer	Yes	Items per page	50
data.pagination.total	Integer	Yes	Total number of items	1
data.pagination.total_pages	Integer	Yes	Total number of pages	1

Response body example:


```
{
    "success": true,
    "data":
    {
        "transactions":
        [
            {
                "id": "txn_789",
                "type": "expense",
                "amount": 2500.00,
                "currency": "RSD",
                "amount_base": 2500.00,
                "base_currency": "RSD",
                "category":
                {
                    "id": "cat_groceries_123",
                    "name": "Groceries",
                    "type": "expense"
                },
                "account":
                {
                    "id": "acc_cash_456",
                    "name": "Cash RSD",
                    "type": "cash"
                },
                "description": "Weekly groceries at Maxi",
                "date": "2025-10-30",
                "created_at": "2025-10-30T14:30:00Z",
                "created_by": "Igor Kudinov"
            }
        ],
        "pagination":
        {
            "page": 1,
            "per_page": 50,
            "total": 1,
            "total_pages": 1
        }
    }
}
```

Request parameters - PATCH - *Update Transaction* (Partial):

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique transaction identifier	txn_789

Body parameter	Type	Required	Description	Example
type	String	No	Transaction type: "income" or "expense"	expense
amount	Number	No	Transaction amount (positive value)	2600.00
currency	String	No	Currency code (RSD or EUR)	EUR
category_id	String	No	Reference to transaction category	cat_groceries_123
account_id	String	No	Reference to account	acc_cash_456
description	String	No	Transaction description	Weekly groceries (updated)
date	String	No	Transaction date (YYYY-MM-DD)	2025-10-31

Request example:

```
PATCH https://api.expensetracker.digitlock.systems/api/v1/transactions/txn_789
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example (partial update - only changed fields):

```
{
    "amount": 2600.00,
    "description": "Weekly groceries (with cleaning supplies)"
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.transaction	Object	Yes	Updated transaction object	See nested parameters below
data.transaction.id	String	Yes	Unique transaction identifier	txn_789

data.transaction.type	String	Yes	Transaction type: "income" or "expense"	expense
data.transaction.amount	Number	Yes	Transaction amount in original currency	2600.00
data.transaction.currency	String	Yes	Original transaction currency	RSD
data.transaction.amount_base	Number	Yes	Amount converted to family base currency	2600.00
data.transaction.category	Object	Yes	Transaction category information	See nested parameters below
data.transaction.category.id	String	Yes	Category unique identifier	cat_groceries_123
data.transaction.category.name	String	Yes	Category display name	Groceries
data.transaction.account	Object	Yes	Account information	See nested parameters below
data.transaction.account.id	String	Yes	Account unique identifier	acc_cash_456
data.transaction.account.name	String	Yes	Account display name	Cash RSD
data.transaction.description	String	No	Transaction description	Weekly groceries (with cleaning supplies)
data.transaction.date	String	Yes	Transaction date (YYYY-MM-DD)	2025-10-30
data.transaction.updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T16:45:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "transaction":
        {
            "id": "txn_789",
            "type": "expense",
            "amount": 2600.00,
            "currency": "RSD",
            "amount_base": 2600.00,
            "category":
            {
                "id": "cat_groceries_123",
                "name": "Groceries"
            },
            "account":
            {
                "id": "acc_cash_456",
                "name": "Cash RSD"
            },
            "description": "Weekly groceries (with cleaning supplies)",
            "date": "2025-10-30",
            "updated_at": "2025-10-30T16:45:00Z"
        }
    }
}
```


Request parameters - DELETE - *Delete Transaction*

Performs soft delete by setting is_active=false

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique transaction identifier	txn_789

Request example:

```
DELETE https://api.expensetracker.digitlock.systems/api/v1/transactions/txn_789
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
message	String	Yes	Request execution message	Resource deleted successfully

Response body example:

```
{
  "success": true,
  "message": "Resource deleted successfully"
}
```

2.1.4 Account Management

Description

Manages family accounts (cash, bank accounts) and provides current balance information with capabilities to create, update, and retrieve account details.
MVP Note: Categories are pre-configured during system setup. Custom category management will be available post-MVP. The system includes standard categories: Income (Salary, Freelance, Other), Expenses (Food, Transport, Utilities, Health, Entertainment, Other).

Endpoints

```
GET    https://api.expensetracker.digitlock.systems/api/v1/accounts
POST   https://api.expensetracker.digitlock.systems/api/v1/accounts
PATCH  https://api.expensetracker.digitlock.systems/api/v1/accounts/{id}
DELETE https://api.expensetracker.digitlock.systems/api/v1/accounts/{id}
GET    https://api.expensetracker.digitlock.systems/api/v1/accounts/{id}/balance
```

Authorization

Bearer JWT token required. Family context extracted from token.

Request parameters - GET - *List Accounts*

Query parameter	Type	Required	Description	Example
include_inactive	Boolean	No	Include inactive records (default: false)	false

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/accounts
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.accounts	Array	Yes	List of family account objects	See nested parameters below
data.accounts[].id	String	Yes	Unique account identifier	acc_cash_456

data.accounts[].name	String	Yes	Account display name	Cash RSD
data.accounts[].type	String	Yes	Account type: "cash", "checking", "savings"	cash
data.accounts[].currency	String	Yes	Account currency (RSD or EUR)	RSD
data.accounts[].current_balance	Number	Yes	Current account balance	15750.00
data.accounts[].is_active	Boolean	Yes	Account status	true
data.accounts[].created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-01T10:00:00Z
data.accounts[].updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T15:30:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "accounts":
        [
            {
                "id": "acc_cash_456",
                "name": "Cash RSD",
                "type": "cash",
                "currency": "RSD",
                "current_balance": 15750.00,
                "is_active": true,
                "created_at": "2025-10-01T10:00:00Z",
                "updated_at": "2025-10-30T15:30:00Z"
            },
            {
                "id": "acc_bank_789",
                "name": "Banca Intesa Checking",
                "type": "checking",
                "currency": "RSD",
                "current_balance": 125340.50,
                "is_active": true,
                "created_at": "2025-10-01T10:00:00Z",
                "updated_at": "2025-10-30T15:30:00Z"
            }
        ]
    }
}
```

Request parameters - POST - *Create Account*:

Body parameter	Type	Required	Description	Example
name	String	Yes	Account display name	Cash EUR
type	String	Yes	Account type: "cash", "checking", "savings"	cash
currency	String	Yes	Account currency (RSD or EUR)	EUR
initial_balance	Number	No	Starting balance (default: 0.00)	500.00

Request example:

```
POST https://api.expensetracker.digitlock.systems/api/v1/accounts
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example:

```
{
    "name": "Cash EUR",
    "type": "cash",
    "currency": "EUR",
    "initial_balance": 500.00
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.account	Object	Yes	Created account object	See nested parameters below
data.account.id	String	Yes	Unique account identifier	acc_cash_new_123
data.account.name	String	Yes	Account display name	Cash EUR
data.account.type	String	Yes	Account type: "cash", "checking", "savings"	cash
data.account.currency	String	Yes	Account currency (RSD or EUR)	EUR
data.account.current_balance	Number	Yes	Current account balance	500.00
data.account.is_active	Boolean	Yes	Account status	true
data.account.created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-30T16:00:00Z
data.account.updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T16:00:00Z

Response body example:

```
{
    "success": true,
    "data":
    {
        "account":
        {
            "id": "acc_cash_new_123",
            "name": "Cash EUR",
            "type": "cash",
            "currency": "EUR",
            "current_balance": 500.00,
            "is_active": true,
            "created_at": "2025-10-30T16:00:00Z",
            "updated_at": "2025-10-30T16:00:00Z"
        }
    }
}
```

Request parameters - PATCH - *Update Account* (Partial):

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique account identifier	acc_cash_456

Body parameter	Type	Required	Description	Example
name	String	No	Updated account name	Cash EUR Updated
is_active	Boolean	No	Account status	false

Request example:

```
PATCH https://api.expensetracker.digitlock.systems/api/v1/accounts/acc_cash_456
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example (partial update - only changed fields):

```
{
    "name": "Cash RSD Updated",
    "is_active": true
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.account	Object	Yes	Updated account object	See nested parameters below
data.account.id	String	Yes	Unique account identifier	acc_cash_456
data.account.name	String	Yes	Account display name	Cash RSD Updated
data.account.type	String	Yes	Account type: "cash", "checking", "savings"	cash
data.account.currency	String	Yes	Account currency (RSD or EUR)	RSD
data.account.current_balance	Number	Yes	Current account balance	15750.00
data.account.is_active	Boolean	Yes	Account status	true
data.account.created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-01T10:00:00Z
data.account.updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T16:05:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "account":
        {
            "id": "acc_cash_456",
            "name": "Cash RSD Updated",
            "type": "cash",
            "currency": "RSD",
            "current_balance": 15750.00,
            "is_active": true,
            "created_at": "2025-10-01T10:00:00Z",
            "updated_at": "2025-10-30T16:05:00Z"
        }
    }
}
```

Request parameters - DELETE - *Delete Account*:

Performs soft delete by setting is_active=false

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique account identifier	acc_cash_456

Request example:

```
DELETE https://api.expensetracker.digitlock.systems/api/v1/accounts/acc_cash_456
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
message	String	Yes	Request execution message	Resource deleted successfully

Response body example:

```
{
    "success": true,
    "message": "Resource deleted successfully"
}
```

Request parameters - GET - *Account Balance*:

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique account identifier	acc_cash_456

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/accounts/acc_cash_456/balance
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.account_id	String	Yes	Unique account identifier	acc_cash_456
data.account_name	String	Yes	Account display name	Cash RSD
data.currency	String	Yes	Account currency (RSD or EUR)	RSD
data.current_balance	Number	Yes	Current account balance	15750.00
data.balance_date	String	Yes	Balance calculation timestamp (ISO 8601)	2025-10-30T16:10:00Z
data.last_transaction_date	String	Yes	Last transaction timestamp (ISO 8601)	2025-10-30T14:30:00Z

Response body example:

```
{
    "success": true,
    "data":
    {
        "account_id": "acc_cash_456",
        "account_name": "Cash RSD",
        "currency": "RSD",
        "current_balance": 15750.00,
        "balance_date": "2025-10-30T16:10:00Z",
        "last_transaction_date": "2025-10-30T14:30:00Z"
    }
}
```

2.1.5 Category Management

Description

Manages income and expense categories for transaction classification with capabilities to create, update, and organize categories hierarchically.

Endpoints

```
GET    https://api.expensetracker.digitlock.systems/api/v1/categories
POST   https://api.expensetracker.digitlock.systems/api/v1/categories
PATCH  https://api.expensetracker.digitlock.systems/api/v1/categories/{id}
DELETE https://api.expensetracker.digitlock.systems/api/v1/categories/{id}
```

Authorization

 Bearer JWT token required. Family context extracted from token.

Request parameters - GET - *List Categories*:

Query parameter	Type	Required	Description	Example
type	String	No	Filter by category type: "income" or "expense"	expense
parent_id	String	No	Filter by parent category	cat_food_parent
is_active	Boolean	No	Filter by status	true
include_inactive	Boolean	No	Include inactive records (default: false)	false

Request example:

```
GET
https://api.expensetracker.digitlock.systems/api/v1/categories?type=expense&is_active=true
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.categories	Array	Yes	List of category objects	See nested parameters below
data.categories[].id	String	Yes	Unique category identifier	cat_groceries_123
data.categories[].name	String	Yes	Category display name	Groceries
data.categories[].type	String	Yes	Category type: "income" or "expense"	expense
data.categories[].parent_id	String	No	Parent category ID for hierarchy (null if root)	cat_food_parent
data.categories[].is_active	Boolean	Yes	Category status	true
data.categories[].created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-01T10:00:00Z
data.categories[].updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-15T14:00:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "categories":
        [
            {
                "id": "cat_groceries_123",
                "name": "Groceries",
                "type": "expense",
                "parent_id": "cat_food_parent",
                "is_active": true,
                "created_at": "2025-10-01T10:00:00Z",
                "updated_at": "2025-10-15T14:00:00Z"
            },
            {
                "id": "cat_salary_456",
                "name": "Salary",
                "type": "income",
                "parent_id": null,
                "is_active": true,
                "created_at": "2025-10-01T10:00:00Z",
                "updated_at": "2025-10-01T10:00:00Z"
            }
        ]
    }
}
```

Request parameters - POST - *Create Category*:

Body parameter	Type	Required	Description	Example
name	String	Yes	Category display name	Transportation
type	String	Yes	Category type: "income" or "expense"	expense
parent_id	String	No	Parent category ID for hierarchy	cat_parent_123

Request example:

```
POST https://api.expensetracker.digitlock.systems/api/v1/categories
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example:

```
{
    "name": "Transportation",
    "type": "expense",
    "parent_id": null
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.category	Object	Yes	Created category object	See nested parameters below
data.category.id	String	Yes	Unique category identifier	cat_transport_789
data.category.name	String	Yes	Category display name	Transportation
data.category.type	String	Yes	Category type: "income" or "expense"	expense
data.category.parent_id	String	No	Parent category ID for hierarchy (null if root)	null
data.category.is_active	Boolean	Yes	Category status	true
data.category.created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-30T16:20:00Z
data.category.updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T16:20:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "category":
        {
            "id": "cat_transport_789",
            "name": "Transportation",
            "type": "expense",
            "parent_id": null,
            "is_active": true,
            "created_at": "2025-10-30T16:20:00Z",
            "updated_at": "2025-10-30T16:20:00Z"
        }
    }
}
```


Request parameters - PATCH - *Update Category* (Partial):

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique category identifier	cat_transport_789

Body parameter	Type	Required	Description	Example
name	String	No	Updated category name	Transportation Updated
parent_id	String	No	New parent category	cat_parent_456
is_active	Boolean	No	Category status	false

Request example:

```
PATCH https://api.expensetracker.digitlock.systems/api/v1/categories/cat_transport_789
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example (partial update - only changed fields):

```
{
    "name": "Transportation & Travel",
    "is_active": true
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.category	Object	Yes	Updated category object	See nested parameters below
data.category.id	String	Yes	Unique category identifier	cat_transport_789
data.category.name	String	Yes	Category display name	Transportation & Travel
data.category.type	String	Yes	Category type: "income" or "expense"	expense
data.category.parent_id	String	No	Parent category ID for hierarchy (null if root)	null
data.category.is_active	Boolean	Yes	Category status	true
data.category.created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-30T16:20:00Z
data.category.updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T16:25:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "category":
        {
            "id": "cat_transport_789",
            "name": "Transportation & Travel",
            "type": "expense",
            "parent_id": null,
            "is_active": true,
            "created_at": "2025-10-30T16:20:00Z",
            "updated_at": "2025-10-30T16:25:00Z"
        }
    }
}
```


Request parameters - DELETE - *Delete category*:

Performs soft delete by setting is_active=false

Path parameter	Type	Required	Description	Example
id	String	Yes	Unique category identifier	cat_transport_789

Request example:

```
DELETE https://api.expensetracker.digitlock.systems/api/v1/categories/cat_transport_789
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
message	String	Yes	Request execution message	Resource deleted successfully

Response body example:

```
{
    "success": true,
    "message": "Resource deleted successfully"
}
```

2.1.6 Basic Reporting

Description

Provides basic financial reports for family budget analysis including spending patterns and monthly summaries.

Endpoints

```
GET https://api.expensetracker.digitlock.systems/api/v1/reports/spending-by-category
GET https://api.expensetracker.digitlock.systems/api/v1/reports/monthly-summary
```

Authorization

🔐 Bearer JWT token required. Family context extracted from token.

Request parameters - GET - *Spending by Category Report*:

Query parameter	Type	Required	Description	Example
start_date	String	No	Report start date (YYYY-MM-DD), default: current month start	2025-10-01
end_date	String	No	Report end date (YYYY-MM-DD), default: current date	2025-10-31
currency	String	No	Currency for amounts (RSD or EUR), default: family base currency	RSD
type	String	No	Transaction type filter: "income", "expense", default: "expense"	expense

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/reports/spending-by-
category?start_date=2025-10-01&end_date=2025-10-31&currency=RSD&type=expense
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.report_type	String	Yes	Type of report generated	spending_by_category
data.period	Object	Yes	Report period information	See nested parameters below
data.period.start_date	String	Yes	Report start date (YYYY-MM-DD)	2025-10-01
data.period.end_date	String	Yes	Report end date (YYYY-MM-DD)	2025-10-31
data.currency	String	Yes	Currency used for amounts	RSD
data.transaction_type	String	Yes	Transaction type filter applied	expense
data.spending_by_category	Array	Yes	List of category spending objects	See nested parameters below
data.spending_by_category[].category_id	String	Yes	Category unique identifier	cat_groceries_123
data.spending_by_category[].category_name	String	Yes	Category display name	Groceries
data.spending_by_category[].total_amount	Number	Yes	Total spending amount for category	18500.00
data.spending_by_category[].transaction_count	Integer	Yes	Number of transactions in category	8
data.spending_by_category[].percentage	Number	Yes	Percentage of total spending	35.2
data.spending_by_category[].average_per_transaction	Number	Yes	Average amount per transaction	2312.50
data.total_amount	Number	Yes	Total amount across all categories	52500.00
data.total_transactions	Integer	Yes	Total number of transactions	35
data.generated_at	String	Yes	Report generation timestamp (ISO 8601)	2025-10-30T16:30:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "report_type": "spending_by_category",
        "period":
        {
            "start_date": "2025-10-01",
            "end_date": "2025-10-31"
        },
        "currency": "RSD",
        "transaction_type": "expense",
        "spending_by_category":
        [
            {
                "category_id": "cat_groceries_123",
                "category_name": "Groceries",
                "total_amount": 18500.00,
                "transaction_count": 8,
                "percentage": 35.2,
                "average_per_transaction": 2312.50
            },
            {
                "category_id": "cat_transport_789",
                "category_name": "Transportation",
                "total_amount": 12300.00,
                "transaction_count": 15,
                "percentage": 23.4,
                "average_per_transaction": 820.00
            }
        ],
        "total_amount": 52500.00,
        "total_transactions": 35,
        "generated_at": "2025-10-30T16:30:00Z"
    }
}
```


Request parameters - GET - *Monthly Summary Report*:

Query parameter	Type	Required	Description	Example
month	String	No	Report month (YYYY-MM), default: current month	2025-10
currency	String	No	Currency for amounts (RSD or EUR), default: family base currency	RSD

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/reports/monthly-summary?month=2025-10&currency=RSD
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.report_type	String	Yes	Type of report generated	monthly_summary
data.month	String	Yes	Report month (YYYY-MM)	2025-10
data.currency	String	Yes	Currency used for amounts	RSD
data.summary	Object	Yes	Financial summary for the month	See nested parameters below
data.summary.total_income	Number	Yes	Total income for the month	125000.00
data.summary.total_expenses	Number	Yes	Total expenses for the month	87500.00
data.summary.net_savings	Number	Yes	Net savings (income - expenses)	37500.00
data.summary.savings_rate	Number	Yes	Savings rate percentage	30.0
data.income_breakdown	Object	Yes	Income by category	See nested parameters below
data.expense_breakdown	Object	Yes	Expenses by category	See nested parameters below
data.account_balances	Object	Yes	Current account balances	See nested parameters below
data.account_balances.total	Number	Yes	Total balance across all accounts	141090.50
data.transaction_counts	Object	Yes	Transaction count statistics	See nested parameters below
data.transaction_counts.income_transactions	Integer	Yes	Number of income transactions	4
data.transaction_counts.expense_transactions	Integer	Yes	Number of expense transactions	45
data.transaction_counts.total_transactions	Integer	Yes	Total number of transactions	49
data.generated_at	String	Yes	Report generation timestamp (ISO 8601)	2025-10-30T16:35:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "report_type": "monthly_summary",
        "month": "2025-10",
        "currency": "RSD",
        "summary":
        {
            "total_income": 125000.00,
            "total_expenses": 87500.00,
            "net_savings": 37500.00,
            "savings_rate": 30.0
        },
        "income_breakdown":
        {
            "salary": 120000.00,
            "freelance": 5000.00
        },
        "expense_breakdown":
        {
            "groceries": 25000.00,
            "transportation": 15000.00,
            "utilities": 12000.00,
            "entertainment": 8500.00,
            "other": 27000.00
        },
        "account_balances":
        {
            "cash_rsd": 15750.00,
            "bank_checking": 125340.50,
            "total": 141090.50
        },
        "transaction_counts":
        {
            "income_transactions": 4,
            "expense_transactions": 45,
            "total_transactions": 49
        },
        "generated_at": "2025-10-30T16:35:00Z"
    }
}
```

2.1.7 Currency Management

Description

Manages multi-currency support for family finances including exchange rate retrieval and currency conversion capabilities.

Endpoints

```
GET https://api.expensetracker.digitlock.systems/api/v1/currencies/rates
GET https://api.expensetracker.digitlock.systems/api/v1/currencies/convert
```

Authorization

🔐 Bearer JWT token required.

Request parameters - GET - *Exchange Rates*:

No request parameters required.

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/currencies/rates
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.base_currency	String	Yes	Base currency for exchange rates	RSD
data.rates	Object	Yes	Exchange rates object with currency codes as keys	See nested parameters below
data.rates.EUR	Number	Yes	Exchange rate from base currency to EUR	0.0085
data.rates.RSD	Number	Yes	Exchange rate from base currency to RSD (always 1.0)	1.0000
data.last_updated	String	Yes	Last update timestamp for exchange rates (ISO 8601)	2025-10-30T12:00:00Z
data.source	String	Yes	Source of exchange rate data	external_api

Response body example:

```
{
    "success": true,
    "data":
    {
        "base_currency": "RSD",
        "rates":
        {
            "EUR": 0.0085,
            "RSD": 1.0000
        },
        "last_updated": "2025-10-30T12:00:00Z",
        "source": "external_api"
    }
}
```

Request parameters - GET - *Currency Conversion*:

Query parameter	Type	Required	Description	Example
amount	Number	Yes	Amount to convert	1000.00
from	String	Yes	Source currency (RSD or EUR)	RSD
to	String	Yes	Target currency (RSD or EUR)	EUR

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/currencies/convert?amount=1000.00&from=RSD&to=EUR
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.original_amount	Number	Yes	Original amount to convert	1000.00
data.original_currency	String	Yes	Source currency code	RSD
data.converted_amount	Number	Yes	Converted amount in target currency	8.50
data.target_currency	String	Yes	Target currency code	EUR
data.exchange_rate	Number	Yes	Exchange rate used for conversion	0.0085
data.conversion_date	String	Yes	Conversion timestamp (ISO 8601)	2025-10-30T16:45:00Z

Response body example:

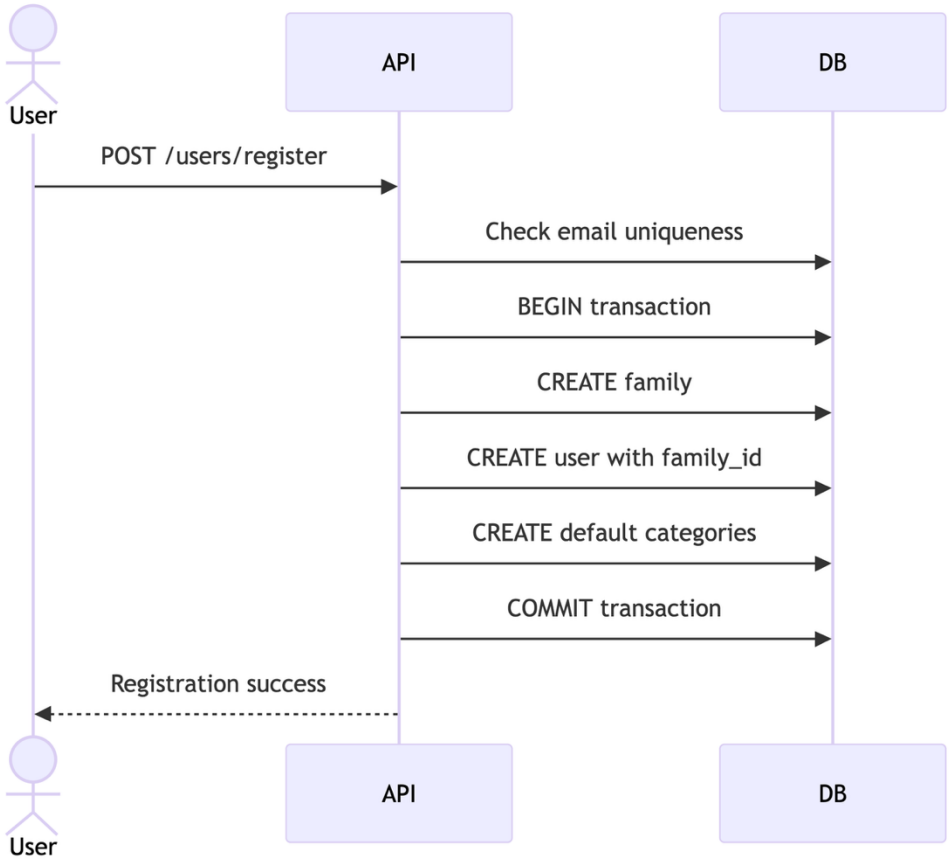

```
{
    "success": true,
    "data":
    {
        "original_amount": 1000.00,
        "original_currency": "RSD",
        "converted_amount": 8.50,
        "target_currency": "EUR",
        "exchange_rate": 0.0085,
        "conversion_date": "2025-10-30T16:45:00Z"
    }
}
```


2.1.8 User Management

Description

Manages user registration, profile updates, and family setup for the expense tracking system.

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant API
    participant DB

    User->>API: POST /users/register
    API->>DB: Check email uniqueness
    API->>DB: BEGIN transaction
    API->>DB: CREATE family
    API->>DB: CREATE user with family_id
    API->>DB: CREATE default categories
    API->>DB: COMMIT transaction
    API-->>User: Registration success
```

Endpoints

```
POST https://api.expensetracker.digitlock.systems/api/v1/users/register
GET  https://api.expensetracker.digitlock.systems/api/v1/users/profile
PATCH https://api.expensetracker.digitlock.systems/api/v1/users/profile
```

Authorization

🔐 Bearer JWT token required only for *User Profile* and *Update Profile* methods.

Request parameters - POST - *Register User*:

Body parameter	Type	Required	Description	Example
email	String	Yes	User email address	igor@example.com
password	String	Yes	User password (min 8 characters)	securePassword123
name	String	Yes	User display name	Igor Kudinov
family_name	String	Yes	Family name for new family creation	Kudinov Family
base_currency	String	Yes	Family base currency (RSD or EUR)	RSD

Request example:

```
POST https://api.expensetracker.digitlock.systems/api/v1/users/register
Content-Type: application/json
Accept: application/json
```

Request body example:

```
{
    "email": "igor@example.com",
    "password": "securePassword123",
    "name": "Igor Kudinov",
    "family_name": "Kudinov Family",
    "base_currency": "RSD"
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.user	Object	Yes	Created user object	See nested parameters below
data.user.id	String	Yes	Unique user identifier	user_123
data.user.email	String	Yes	User email address	igor@example.com
data.user.name	String	Yes	User display name	Igor Kudinov
data.user.family_id	String	Yes	Family identifier	family_456
data.user.family_name	String	Yes	Family display name	Kudinov Family
data.user.is_active	Boolean	Yes	User account status	true
data.user.created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-30T17:00:00Z
data.message	String	Yes	Registration confirmation message	User registered successfully. Please login to continue.

Response body example:


```
{
    "success": true,
    "data":
    {
        "user":
        {
            "id": "user_123",
            "email": "igor@example.com",
            "name": "Igor Kudinov",
            "family_id": "family_456",
            "family_name": "Kudinov Family",
            "is_active": true,
            "created_at": "2025-10-30T17:00:00Z"
        },
        "message": "User registered successfully. Please login to continue."
    }
}
```


Request parameters - GET - *User Profile*:

No request parameters required.

Request example:

```
GET https://api.expensetracker.digitlock.systems/api/v1/users/profile
Accept: application/json
Authorization: Bearer <token>
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.user	Object	Yes	User profile object	See nested parameters below
data.user.id	String	Yes	Unique user identifier	user_123
data.user.email	String	Yes	User email address	igor@example.com
data.user.name	String	Yes	User display name	Igor Kudinov
data.user.family	Object	Yes	Family information	See nested parameters below
data.user.family.id	String	Yes	Family unique identifier	family_456
data.user.family.name	String	Yes	Family display name	Kudinov Family
data.user.family.base_currency	String	Yes	Family base currency	RSD
data.user.family.member_count	Integer	Yes	Number of family members	2
data.user.is_active	Boolean	Yes	User account status	true
data.user.created_at	String	Yes	Record creation timestamp (ISO 8601)	2025-10-30T17:00:00Z
data.user.last_login	String	Yes	Last login timestamp (ISO 8601)	2025-10-30T17:30:00Z

Response body example:


```
{
    "success": true,
    "data":
    {
        "user":
        {
            "id": "user_123",
            "email": "igor@example.com",
            "name": "Igor Kudinov",
            "family":
            {
                "id": "family_456",
                "name": "Kudinov Family",
                "base_currency": "RSD",
                "member_count": 2
            },
            "is_active": true,
            "created_at": "2025-10-30T17:00:00Z",
            "last_login": "2025-10-30T17:30:00Z"
        }
    }
}
```

Request parameters - PATCH - *Update Profile* (Partial)

Body parameter	Type	Required	Description	Example
name	String	No	Updated user display name	Igor K. Updated
password	String	No	New password (min 8 characters)	newPassword456

Request example:

```
PATCH https://api.expensetracker.digitlock.systems/api/v1/users/profile
Content-Type: application/json
Accept: application/json
Authorization: Bearer <token>
```

Request body example (partial update - only changed fields):

```
{
    "name": "Igor K. Updated"
}
```

Response parameters:

Body parameter	Type	Required	Description	Example
success	Boolean	Yes	Request execution status	true
data	Object	Yes	Response data container	See nested parameters below
data.user	Object	Yes	Updated user object	See nested parameters below
data.user.id	String	Yes	Unique user identifier	user_123
data.user.email	String	Yes	User email address	igor@example.com
data.user.name	String	Yes	Updated user display name	Igor K. Updated
data.user.family_id	String	Yes	Family identifier	family_456
data.user.updated_at	String	Yes	Last update timestamp (ISO 8601)	2025-10-30T17:35:00Z
data.message	String	Yes	Update confirmation message	Profile updated successfully

Response body example:

```
{
    "success": true,
    "data":
    {
        "user":
        {
            "id": "user_123",
            "email": "igor@example.com",
            "name": "Igor K. Updated",
            "family_id": "family_456",
            "updated_at": "2025-10-30T17:35:00Z"
        },
        "message": "Profile updated successfully"
    }
}
```

2.2 User Interface

2.2.1 Dashboard (Main Screen)

Use case scenario

User opens the application and immediately sees their current financial status: account balances, recent transactions, and quick action buttons for adding new income/expenses.

Actions occurring during form opening

- GET /api/v1/accounts (load current balances)
- GET /api/v1/transactions?limit=10 (load recent transactions)
- GET /api/v1/reports/monthly-summary (load current month overview)

Designs

Link to Figma: *Dashboard Wireframe (to be created)*

Basic layout:

- Top section: Family total balance + currency selector (RSD/EUR)
- Middle section: Quick action buttons (Add Income, Add Expense)
- Bottom section: Recent transactions list (last 10)

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	View and manage family finances	Read/write all family transactions, accounts, categories

Location

Default landing page after login.

Modes and configuration

Single view mode. Currency display can be toggled between RSD and EUR.

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Total Balance	Display	No	Yes	GET /accounts	Sum of all account balances	Currency formatting
Currency Toggle	Button	Yes	Yes	Local state	Switch between RSD/EUR view	•
Add Income Button	Button	Yes	Yes	Navigation	Opens Add Income form	•
Add Expense Button	Button	Yes	Yes	Navigation	Opens Add Expense form	•
Recent Transactions	List	No	Yes	GET /transactions	Last 10 transactions	Pagination

2.2.2 Add Transaction Form

Use case scenario

User needs to quickly record an income or expense. Form should be simple and optimized for mobile input with commonly used categories and accounts readily available.

Actions occurring during form opening

- GET /api/v1/categories (load available categories filtered by transaction type)
- GET /api/v1/accounts (load available accounts)

Designs

Link to Figma: *Add Transaction Form (to be created)*

Form layout with:

- Transaction type toggle (Income/Expense)
- Amount input (large, numeric keyboard)
- Currency selector (RSD/EUR)
- Category drop-down (filtered by type)
- Account selector
- Date picker (defaults to today)
- Optional description field

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	Add new financial transactions	Create transactions for family

Location

Accessible from Dashboard via "Add Income" or "Add Expense" buttons, or main navigation menu.

Modes and configuration

- **Income Mode**: Shows income categories, positive amount handling
- **Expense Mode**: Shows expense categories, positive amount handling (automatically treated as expense)

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Transaction Type	Toggle	Yes	Yes	Local state	Income/Expense selector	Required
Amount	Number Input	Yes	Yes	User input	Transaction amount	Required, >0, max 2 decimal places
Currency	Select	Yes	Yes	Static (RSD/EUR)	Currency selector	Required
Category	Select	Yes	Yes	GET /categories	Transaction category	Required
Account	Select	Yes	Yes	GET /accounts	Source/target account	Required
Date	Date Picker	Yes	Yes	User input	Transaction date	Required, not future
Description	Text Input	Yes	Yes	User input	Optional description	Max 255 chars
Save Button	Button	Yes	Yes	Form action	Submit transaction	Form validation

2.2.3 Login Screen

Use case scenario

User enters email and password to authenticate and access family financial data. System validates credentials and redirects to dashboard upon successful login.
Actions occurring during form opening

- No API calls required on form load

Designs

Link to Figma: *Login Screen (to be created)*

Simple centered form with:

- Application logo/title
- Email input field
- Password input field
- Login button
- "Register" link for new users

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Anonymous User	System authentication	Access to login functionality

Location

Entry point of the application, accessible when not authenticated.

Modes and configuration

Single mode. Form validation on client and server side.

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Email	Text Input	Yes	Yes	User input	User email address	Required, email format
Password	Password Input	Yes	Yes	User input	User password	Required, min 8 characters
Login Button	Button	Yes	Yes	Form action	Submit credentials	Form validation
Register Link	Link	Yes	Yes	Navigation	Navigate to registration	•
Error Message	Display	No	Conditional	API response	Authentication error display	•

2.2.4 Registration Screen

Use case scenario

New user creates account and family setup. User provides personal information, creates family, and sets base currency for financial tracking.

Actions occurring during form opening

- No API calls required on form load

Designs

Link to Figma: *Registration Screen (to be created)*

Multi-step form with:

- User information (email, password, name)
- Family setup (family name, base currency)
- Terms and conditions acceptance
- Submit button

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Anonymous User	Account creation	Access to registration functionality

Location

Accessible from Login screen via "Register" link.

Modes and configuration

Single mode with step-by-step validation.

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Email	Text Input	Yes	Yes	User input	User email address	Required, email format, unique
Password	Password Input	Yes	Yes	User input	User password	Required, min 8 characters
Confirm Password	Password Input	Yes	Yes	User input	Password confirmation	Required, match password
Name	Text Input	Yes	Yes	User input	User display name	Required, max 100 chars
Family Name	Text Input	Yes	Yes	User input	Family display name	Required, max 100 chars
Base Currency	Select	Yes	Yes	Static (RSD/EUR)	Family base currency	Required
Register Button	Button	Yes	Yes	Form action	Submit registration	Form validation
Login Link	Link	Yes	Yes	Navigation	Navigate to login	•

2.2.5 Transactions List Screen

Use case scenario

User views complete list of family transactions with filtering and search capabilities. Allows quick overview of financial activity and navigation to individual transaction details.

Actions occurring during form opening

- GET /api/v1/transactions (load transactions with pagination)
- GET /api/v1/categories (load categories for filtering)
- GET /api/v1/accounts (load accounts for filtering)

Designs

Link to Figma: *Transactions List (to be created)*

Layout with:

- Filter bar (type, category, account, date range)
- Transaction list with key information
- Pagination controls
- Add transaction floating button

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	View family transactions	Read all family transactions

Location

Accessible from main navigation menu or "View All" link from Dashboard.

Modes and configuration

Single view with filtering options. Supports pagination for large datasets.

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Type Filter	Select	Yes	Yes	Static (All/Income/Expense)	Filter by transaction type	•
Category Filter	Select	Yes	Yes	GET /categories	Filter by category	•
Account Filter	Select	Yes	Yes	GET /accounts	Filter by account	•
Date Range Filter	Date Range	Yes	Yes	User input	Filter by date range	Valid date range
Transaction List	List	No	Yes	GET /transactions	Paginated transaction list	•
Pagination	Controls	Yes	Yes	API pagination	Navigate through pages	•
Add Transaction Button	Button	Yes	Yes	Navigation	Open add transaction form	•

2.2.6 Transaction Details/Edit Screen

Use case scenario

User views detailed information about a specific transaction and can edit or delete it. Form is pre-populated with existing transaction data.

Actions occurring during form opening

- GET /api/v1/transactions/{id} (load transaction details)
- GET /api/v1/categories (load available categories)
- GET /api/v1/accounts (load available accounts)

Designs

Link to Figma: *Transaction Edit (to be created)*

Form layout similar to Add Transaction with:

- Pre-populated fields with existing data
- Edit/Save mode toggle
- Delete button with confirmation
- Cancel button to return to list

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	Edit family transactions	Update/delete family transactions

Location

Accessible by clicking on transaction from Transactions List or Dashboard recent transactions.

Modes and configuration

- **View Mode**: Display-only transaction details
- **Edit Mode**: Editable form fields for transaction modification

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Transaction Type	Display/Toggle	Edit mode only	Yes	Transaction data	Income/Expense type	Required in edit mode
Amount	Display/Number Input	Edit mode only	Yes	Transaction data	Transaction amount	Required, >0, max 2 decimal places
Currency	Display/Select	Edit mode only	Yes	Transaction data	Currency selector	Required in edit mode
Category	Display/Select	Edit mode only	Yes	Transaction data	Transaction category	Required in edit mode
Account	Display/Select	Edit mode only	Yes	Transaction data	Source/target account	Required in edit mode
Date	Display/Date Picker	Edit mode only	Yes	Transaction data	Transaction date	Required, not future

Description	Display/Text Input	Edit mode only	Yes	Transaction data	Transaction description	Max 255 chars
Edit Button	Button	Yes	View mode	Local state	Switch to edit mode	•
Save Button	Button	Yes	Edit mode	Form action	Save transaction changes	Form validation
Cancel Button	Button	Yes	Edit mode	Local state	Cancel edit, return to view	•
Delete Button	Button	Yes	Yes	Form action	Delete transaction	Confirmation dialog

2.2.7 Accounts Management Screen

Use case scenario

User manages family accounts (cash, bank accounts) including creating new accounts, editing existing ones, and viewing current balances.

Actions occurring during form opening

- GET /api/v1/accounts (load all family accounts)

Designs

Link to Figma: *Accounts Management (to be created)*

Layout with:

- Accounts list with balance information
- Add new account button
- Edit/delete actions for each account
- Total balance summary

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	Manage family accounts	Create/read/update family accounts

Location

Accessible from main navigation menu or settings.

Modes and configuration

Single view with inline editing capabilities for account names and status.

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Accounts List	List	No	Yes	GET /accounts	List of family accounts	•
Account Balance	Display	No	Yes	Account data	Current account balance	Currency formatting
Account Name	Text Input	Yes	Yes	Account data	Editable account name	Required, max 100 chars
Account Status	Toggle	Yes	Yes	Account data	Active/inactive status	•
Add Account Button	Button	Yes	Yes	Modal/Form	Open add account form	•
Total Balance	Display	No	Yes	Calculated	Sum of all account balances	Currency formatting

2.2.8 Reports Screen

Use case scenario

User views basic financial reports to analyze spending patterns and monthly summaries. Helps with budget planning and financial decision making.

Actions occurring during form opening

- GET /api/v1/reports/monthly-summary (load current month summary)
- GET /api/v1/reports/spending-by-category (load category breakdown)

Designs

Link to Figma: *Reports Screen (to be created)*

Layout with:

- Month selector for reports
- Currency toggle (RSD/EUR)
- Monthly summary section (income, expenses, savings)
- Spending by category chart/list
- Export options (future enhancement)

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	View family financial reports	Read family financial data

Location

Accessible from main navigation menu.

Modes and configuration

Single view with month selection and currency toggle options.

Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
Month Selector	Select	Yes	Yes	Generated list	Select report month	•
Currency Toggle	Button	Yes	Yes	Local state	Switch between RSD/EUR	•
Total Income	Display	No	Yes	Monthly summary	Total income for period	Currency formatting
Total Expenses	Display	No	Yes	Monthly summary	Total expenses for period	Currency formatting
Net Savings	Display	No	Yes	Calculated	Income minus expenses	Currency formatting
Savings Rate	Display	No	Yes	Calculated	Savings percentage	Percentage formatting
Category Breakdown	Chart/List	No	Yes	Category report	Spending by category	•

2.2.9 User Profile Screen

Use case scenario

User manages personal profile information, family settings, and basic application preferences. Allows updating name, password, and viewing family information.

Actions occurring during form opening

- GET /api/v1/users/profile (load user profile and family data)

Designs

Link to Figma: *User Profile (to be created)*

Form layout with:

- User information section (name, email)
- Password change section
- Family information display
- Account settings and preferences

Roles and permissions

№	Name of the role	For what it needs access	What permissions it has
1	Family Member	Manage personal profile	Update own profile information

Location

Accessible from main navigation menu or user avatar/menu.

Modes and configuration

Single form with sectioned information and save functionality.

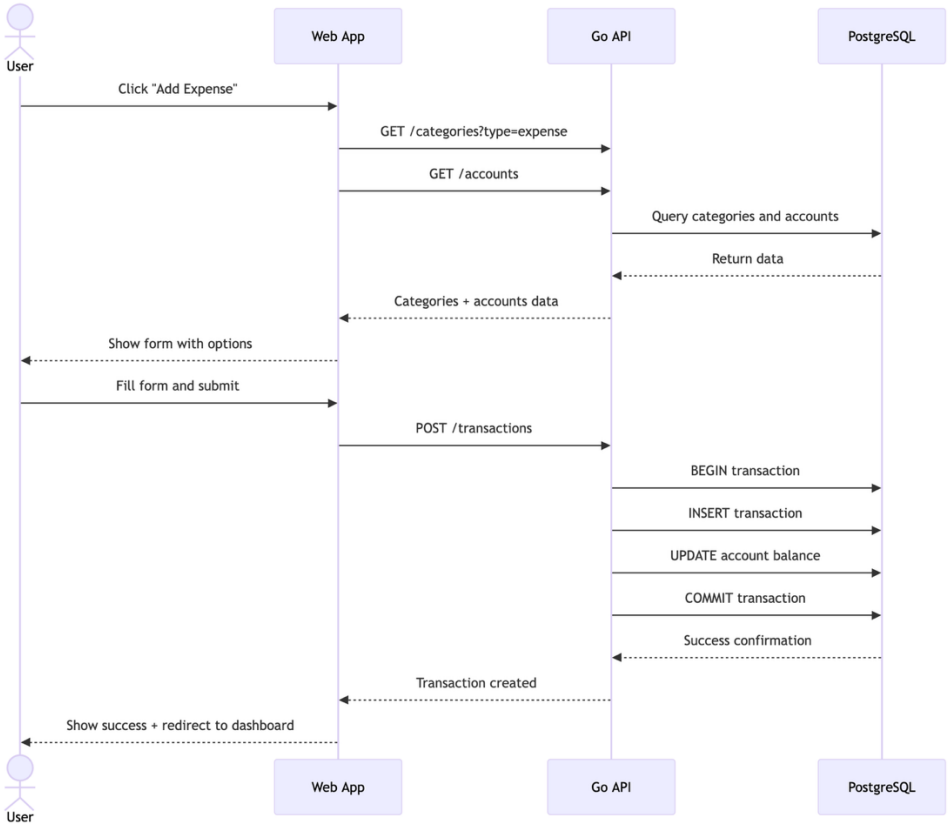
Elements

Name	Type	Is editable	Is visible	Source	Description	Validation
User Name	Text Input	Yes	Yes	User profile	User display name	Required, max 100 chars
Email	Display	No	Yes	User profile	User email (read-only)	•
Current Password	Password Input	Yes	Conditional	User input	Required for password change	Required if changing password
New Password	Password Input	Yes	Conditional	User input	New password	Min 8 chars if provided
Confirm New Password	Password Input	Yes	Conditional	User input	Confirm new password	Match new password
Family Name	Display	No	Yes	Family data	Family name (read-only)	•
Base Currency	Display	No	Yes	Family data	Family base currency (read-only)	•
Family Members	Display	No	Yes	Family data	Number of family members	•
Save Button	Button	Yes	Yes	Form action	Save profile changes	Form validation
Logout Button	Button	Yes	Yes	Auth action	Logout from application	Confirmation

2.3 Use Case

2.3.1 Daily Transaction Entry

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL

    User->>Web: Click "Add Expense"
    Web->>API: GET /categories?type=expense
    Web->>API: GET /accounts
    API->>DB: Query categories and accounts
    DB-->>API: Return data
    API-->>Web: Categories + accounts data
    Web-->>User: Show form with options

    User->>Web: Fill form and submit
    Web->>API: POST /transactions
    API->>DB: BEGIN transaction
    API->>DB: INSERT transaction
    API->>DB: UPDATE account balance
    API->>DB: COMMIT transaction
    DB-->>API: Success confirmation
    API-->>Web: Transaction created
    Web-->>User: Show success + redirect to dashboard
```

Algorithm

1. User navigates to add transaction form
2. System loads current categories and accounts for family
3. User fills transaction details (amount, category, account, date)
4. System validates input data
5. System creates transaction record
6. System updates account balance atomically
7. System shows confirmation and returns to dashboard

Preconditions

- User is authenticated with valid JWT token
- User has access to family financial data
- Family has at least one account and one category configured

Trigger

User clicks "Add Income" or "Add Expense" button from dashboard or menu.

Basic Flow

1. **Form Loading**: Load and display transaction form with categories/accounts
2. **Data Entry**: User enters amount, selects category, account, and date
3. **Validation**: Client-side validation (required fields, amount format)
4. **Submission**: Submit transaction data to API
5. **Server Processing**: Validate, create transaction, update account balance
6. **Confirmation**: Display success message and refresh dashboard

Exception Paths

- **Invalid Amount**: Show error "Please enter valid amount"
- **Missing Required Fields**: Highlight missing fields with error messages
- **Server Error**: Show "Transaction failed, please try again" with retry option
- **Network Error**: Show offline mode message, queue transaction for retry

Acceptance Criteria

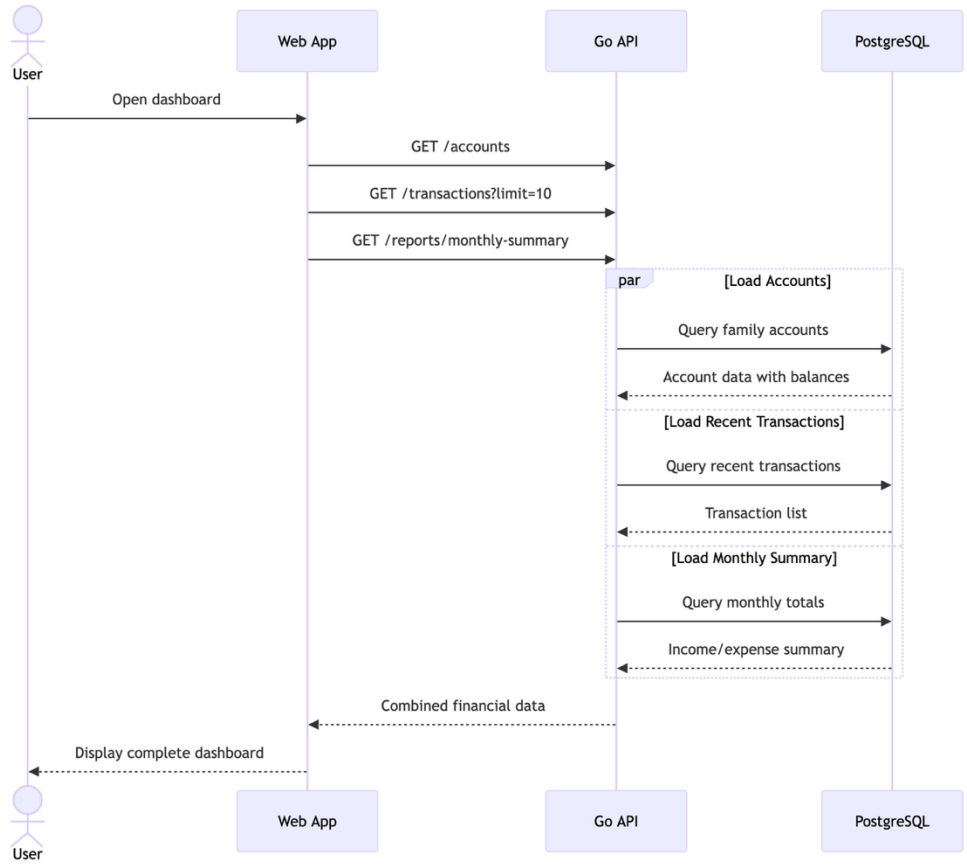
- Transaction is recorded with correct amount, category, account, and date
- Account balance is updated accurately
- Transaction appears in recent transactions list
- User receives confirmation of successful entry
- Form validation prevents invalid data submission

Postconditions

- New transaction record exists in database
- Account balance reflects the transaction
- Transaction is visible in family financial reports
- Audit log contains transaction creation record

2.3.2 Family Budget Overview

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL

    User->>Web: Open dashboard
    Web->>API: GET /accounts
    Web->>API: GET /transactions?limit=10
    Web->>API: GET /reports/monthly-summary

    par Load Accounts
        API->>DB: Query family accounts
        DB-->>API: Account data with balances
    and Load Recent Transactions
        API->>DB: Query recent transactions
        DB-->>API: Transaction list
    and Load Monthly Summary
        API->>DB: Query monthly totals
        DB-->>API: Income/expense summary
    end

    API-->>Web: Combined financial data
    Web-->>User: Display complete dashboard
```

Algorithm

1. User opens dashboard
2. System loads current account balances
3. System loads recent transactions (last 10)
4. System calculates monthly summary (income vs expenses)
5. System displays comprehensive financial overview
6. User can navigate to detailed views or add new transactions

Preconditions

- User is authenticated
- Family has financial data (accounts, transactions)

Trigger

User logs in or navigates to dashboard.

Basic Flow

1. **Dashboard Loading**: Load account balances and recent activity
2. **Summary Calculation**: Calculate monthly income and expenses
3. **Display Overview**: Show total balance, recent transactions, monthly summary
4. **User Actions**: Provide quick access to add new transactions or view reports

Exception Paths

- **No Data**: Show "Get started" message with setup instructions
- **Loading Error**: Show cached data if available, or error message
- **Slow Response**: Show loading indicators, load data progressively

Acceptance Criteria

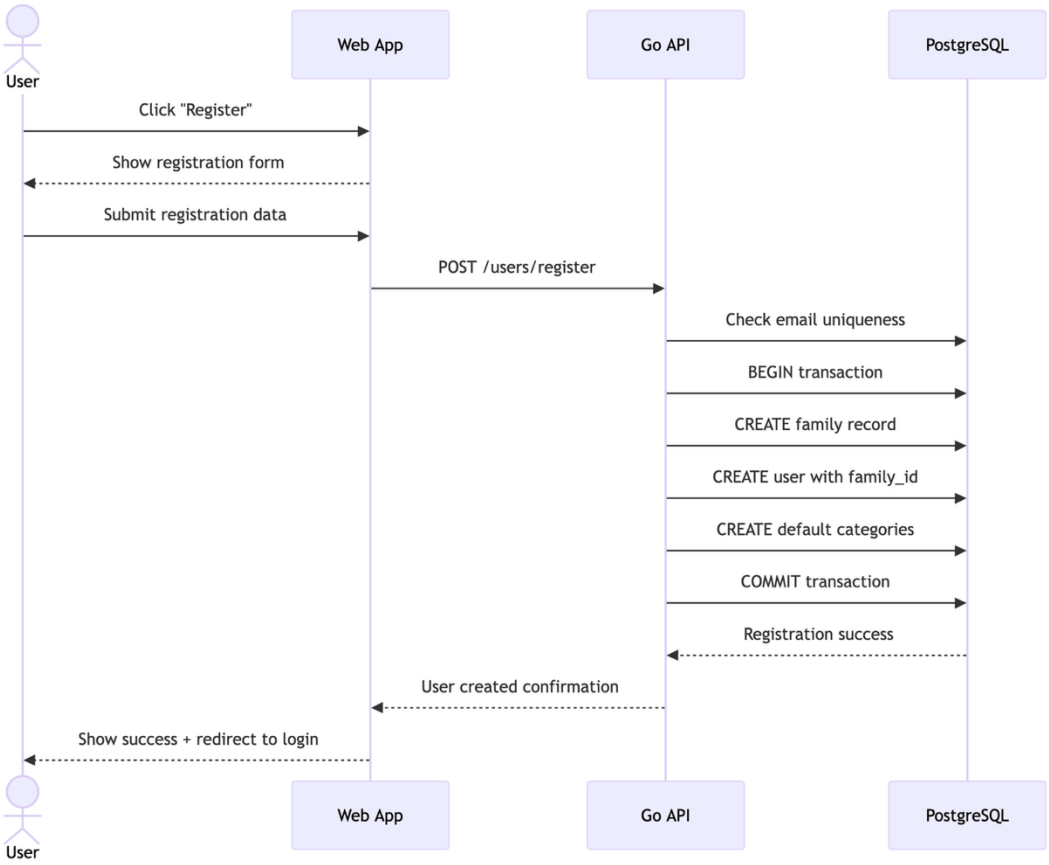
- All account balances are current and accurate
- Recent transactions show latest family activity
- Monthly summary reflects current period totals
- Dashboard loads within 3 seconds
- User can quickly access main actions

Postconditions

- User has complete view of family financial status
- User can make informed decisions about spending
- User has quick access to transaction entry

2.3.3 User Registration and Family Setup

Sequence diagram



Mermaid code

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL

    User->>Web: Click "Register"
    Web-->>User: Show registration form

    User->>Web: Submit registration data
    Web->>API: POST /users/register
    API->>DB: Check email uniqueness
    API->>DB: BEGIN transaction
    API->>DB: CREATE family record
    API->>DB: CREATE user with family_id
    API->>DB: CREATE default categories
    API->>DB: COMMIT transaction
    DB-->>API: Registration success
    API-->>Web: User created confirmation
    Web-->>User: Show success + redirect to login
```

Algorithm

1. User navigates to registration form
2. User fills personal and family information
3. System validates data (email uniqueness, password strength)
4. System creates family entity
5. System creates user account linked to family
6. System sets up default categories for the family
7. System confirms registration and redirects to login

Preconditions

- User is not authenticated
- Email address is not already registered

Trigger

User clicks "Register" link from login screen or landing page.

Basic Flow

1. **Form Display**: Show registration form with required fields
2. **Data Collection**: Collect user info, family name, base currency
3. **Validation**: Validate email format, password strength, required fields
4. **Family Creation**: Create new family entity with specified settings
5. **User Account**: Create user account linked to family
6. **Default Setup**: Create default expense/income categories
7. **Confirmation**: Show success message and redirect to login

Exception Paths

- **Email Already Exists**: Show "Email already registered" error
- **Weak Password**: Show password requirements
- **Network Error**: Save form data locally, retry when connection restored
- **Server Error**: Show error message with retry option

Acceptance Criteria

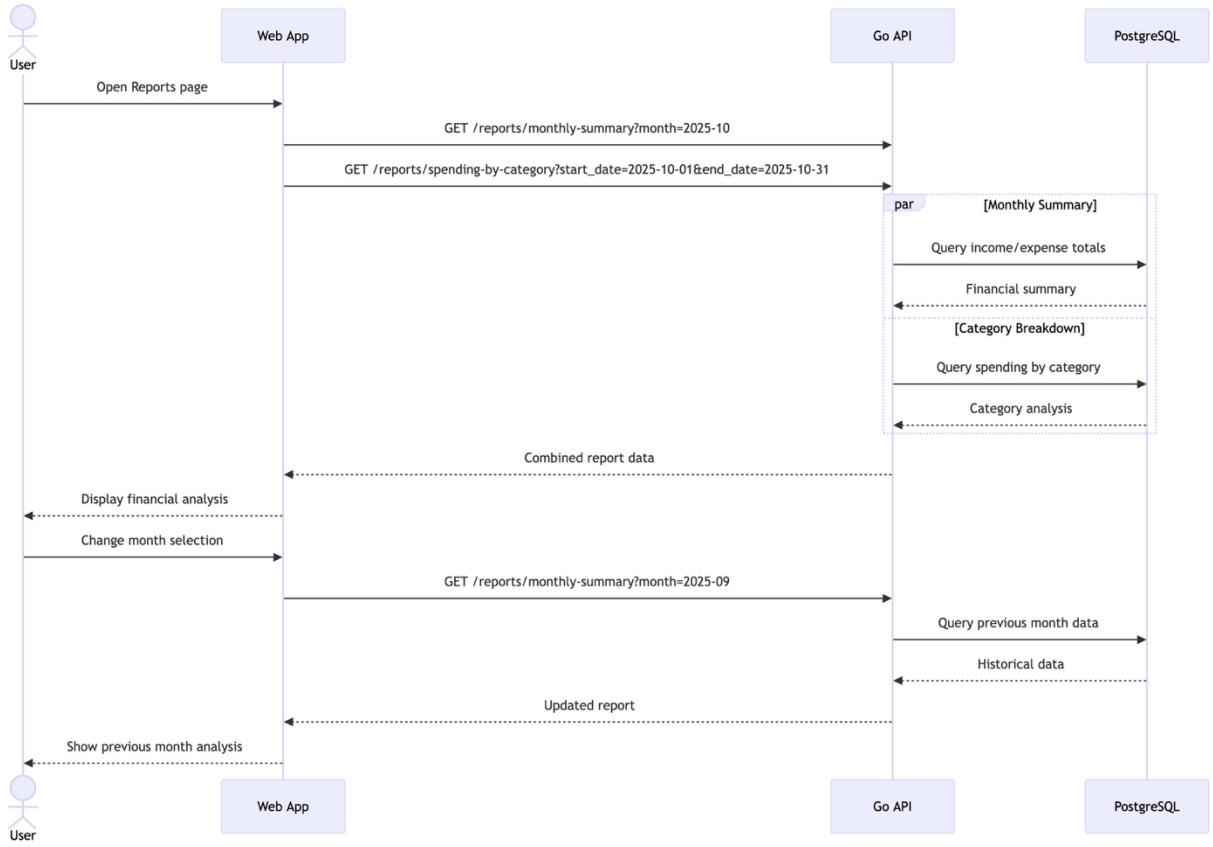
- New family is created with specified name and base currency
- User account is created and linked to family
- Default categories are available for immediate use
- User can log in immediately after registration
- Email uniqueness is enforced

Postconditions

- Family entity exists with unique identifier
- User can authenticate and access family financial data
- Default categories are available for transaction entry
- System is ready for first transaction

2.3.4 Monthly Financial Review

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL

    User->>Web: Open Reports page
    Web->>API: GET /reports/monthly-summary?month=2025-10
    Web->>API: GET /reports/spending-by-category?start_date=2025-10-01&end_date=2025-10-31
    par Monthly Summary
        API->>DB: Query income/expense totals
        DB-->>API: Financial summary
    and Category Breakdown
        API->>DB: Query spending by category
        DB-->>API: Category analysis
    end
    API-->>Web: Combined report data
    Web-->>User: Display financial analysis
    User->>Web: Change month selection
    Web->>API: GET /reports/monthly-summary?month=2025-09
    API->>DB: Query previous month data
    DB-->>API: Historical data
    API-->>Web: Updated report
    Web-->>User: Show previous month analysis
```

Algorithm

1. User opens reports screen
2. System loads current month financial summary
3. System loads spending breakdown by category
4. System displays income, expenses, savings rate
5. User can navigate between months for comparison
6. System provides insights into spending patterns

Preconditions

- User is authenticated
- Family has transaction history

Trigger

User navigates to Reports section from main menu.

Basic Flow

1. **Report Loading**: Load current month financial summary
2. **Data Analysis**: Calculate totals, percentages, trends
3. **Visualization**: Display charts and summaries
4. **Month Navigation**: Allow month-by-month review
5. **Insights**: Highlight spending patterns and savings

Exception Paths

- **No Data for Period**: Show "No transactions for this period"
- **Loading Error**: Show cached data if available
- **Currency Change**: Recalculate all amounts in selected currency

Acceptance Criteria

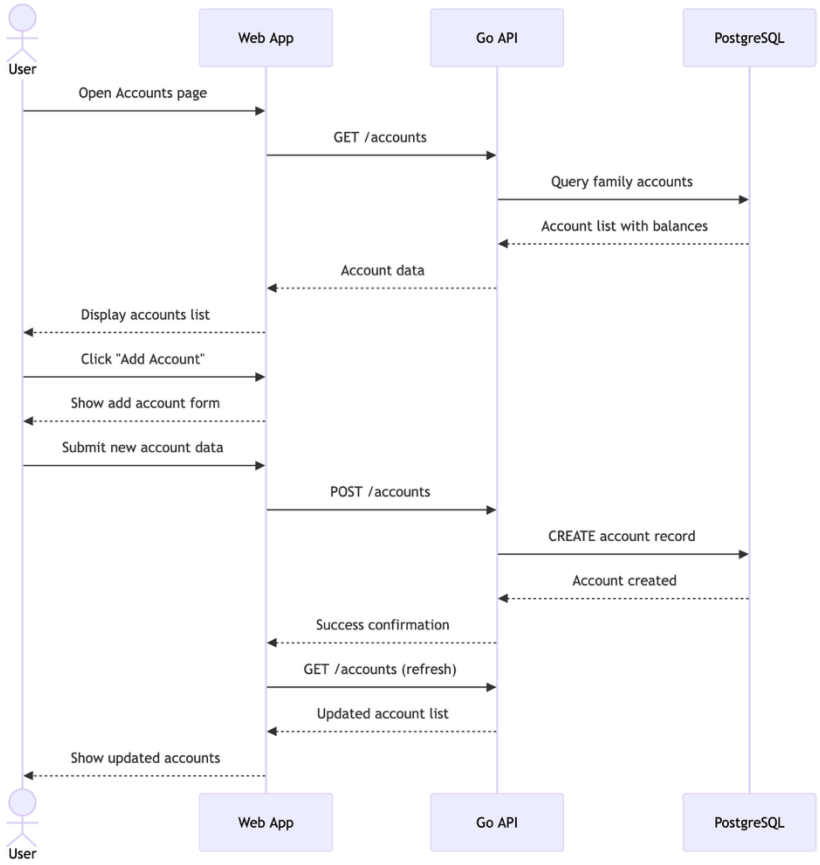
- Accurate calculation of income, expenses, and net savings
- Correct categorization of spending breakdown
- Month-to-month navigation works smoothly
- Savings rate calculated correctly
- Reports load within 5 seconds

Postconditions

- User understands monthly financial performance
- User can identify spending trends and patterns
- User has data to make informed financial decisions

2.3.5 Account Balance Management

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL

    User->>Web: Open Accounts page
    Web->>API: GET /accounts
    API->>DB: Query family accounts
    DB-->>API: Account list with balances
    API-->>Web: Account data
    Web-->>User: Display accounts list

    User->>Web: Click "Add Account"
    Web-->>User: Show add account form

    User->>Web: Submit new account data
    Web->>API: POST /accounts
    API->>DB: CREATE account record
    DB-->>API: Account created
    API-->>Web: Success confirmation
    Web->>API: GET /accounts (refresh)
    API-->>Web: Updated account list
    Web-->>User: Show updated accounts
```

Algorithm

1. User opens account management screen
2. System displays all family accounts with current balances
3. User can add new accounts (cash, checking, savings)
4. User can edit account names and status
5. System maintains balance calculations automatically
6. User can view account transaction history

Preconditions

- User is authenticated
- User has family management permissions

Trigger

User navigates to Accounts section from main menu.

Basic Flow

1. **Account Display**: Show all family accounts with balances
2. **Account Creation**: Allow adding new accounts with type and currency
3. **Account Editing**: Enable editing account names and status
4. **Balance Tracking**: Display real-time calculated balances
5. **Account History**: Provide access to account transaction history

Exception Paths

- **Duplicate Account Name**: Show "Account name already exists"
- **Cannot Delete Account**: Show "Cannot delete account with transactions"
- **Balance Calculation Error**: Recalculate from transaction history

Acceptance Criteria

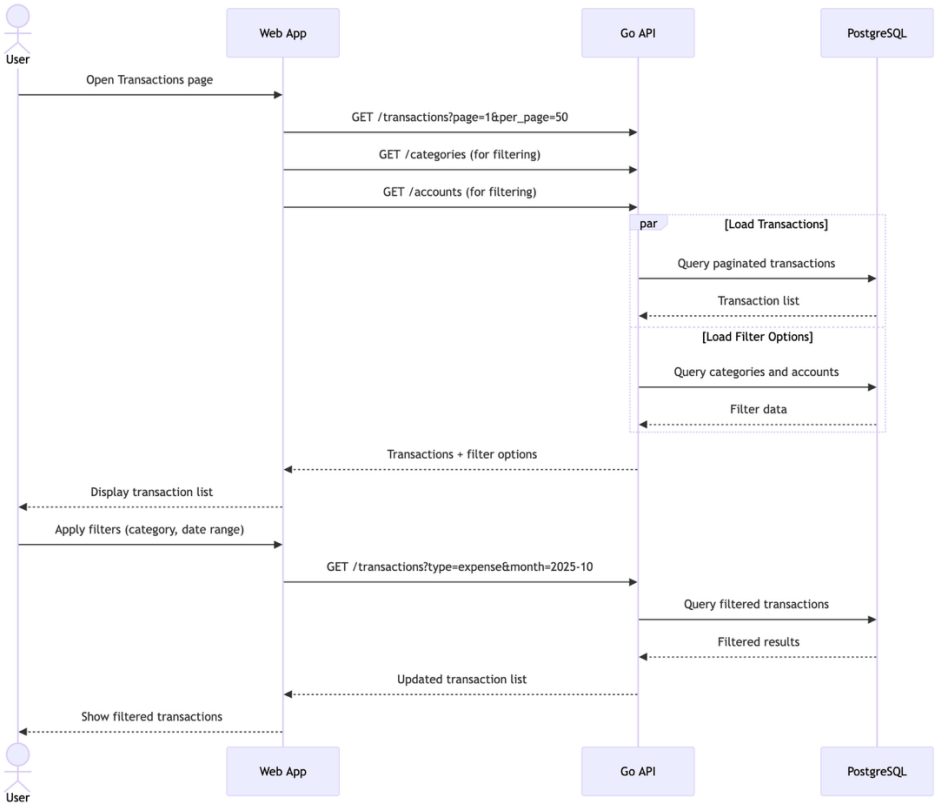
- All family accounts displayed with correct balances
- New accounts can be created with proper validation
- Account balances update automatically with transactions
- Account status changes reflect in transaction forms
- Total family balance calculated correctly

Postconditions

- Family has organized account structure
- Account balances are accurate and up-to-date
- Users can effectively track money across different accounts

2.3.6 Transaction History Review

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL

    User->>Web: Open Transactions page
    Web->>API: GET /transactions?page=1&per_page=50
    Web->>API: GET /categories (for filtering)
    Web->>API: GET /accounts (for filtering)
    par Load Transactions
        API->>DB: Query paginated transactions
        DB-->>API: Transaction list
    and Load Filter Options
        API->>DB: Query categories and accounts
        DB-->>API: Filter data
    end
    API-->>Web: Transactions + filter options
    Web-->>User: Display transaction list
    User->>Web: Apply filters (category, date range)
    Web->>API: GET /transactions?type=expense&month=2025-10
    API->>DB: Query filtered transactions
    DB-->>API: Filtered results
    API-->>Web: Updated transaction list
    Web-->>User: Show filtered transaction
```

Algorithm

1. User opens transactions list screen
2. System loads recent transactions with pagination
3. System provides filtering options (type, category, account, date)
4. User can search and filter transaction history
5. User can click on transactions to view/edit details
6. System supports efficient pagination for large datasets

Preconditions

- User is authenticated
- Family has transaction history

Trigger

User navigates to Transactions section or clicks "View All" from dashboard.

Basic Flow

1. **Transaction Loading**: Load paginated transaction list
2. **Filter Setup**: Provide filtering options for search
3. **Search/Filter**: Allow filtering by multiple criteria
4. **Transaction Selection**: Enable viewing transaction details
5. **Pagination**: Support navigation through large transaction sets

Exception Paths

- **No Transactions Found**: Show "No transactions match your criteria"
- **Loading Timeout**: Show partial results with retry option
- **Filter Error**: Reset filters and show all transactions

Acceptance Criteria

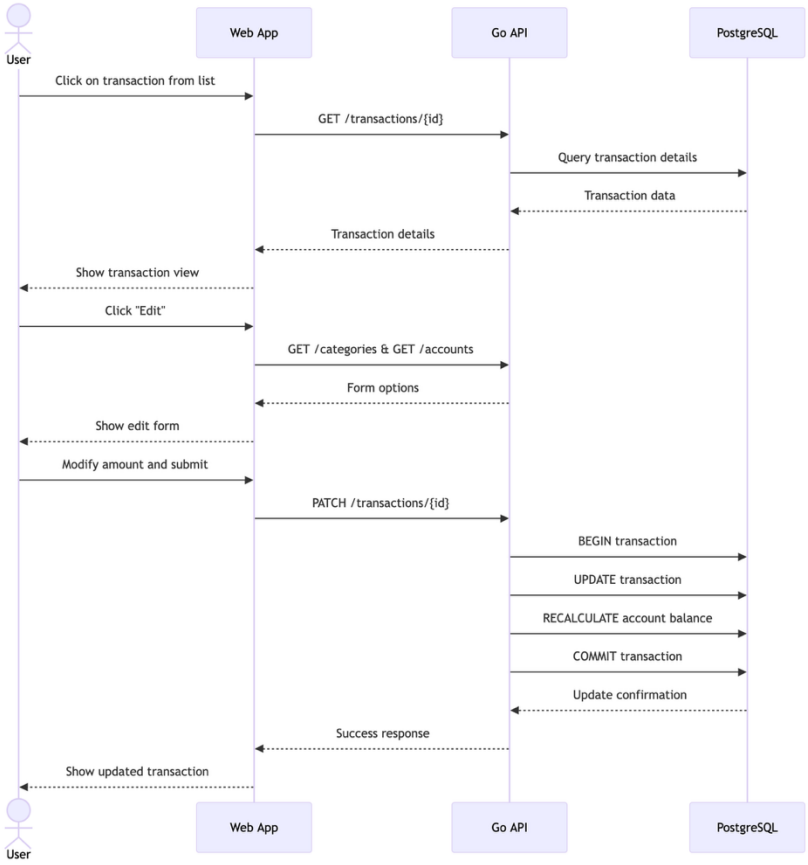
- Transactions displayed in chronological order (newest first)
- Filtering works correctly for all criteria
- Pagination handles large transaction volumes efficiently
- Transaction details accessible from list view
- Search results are accurate and fast

Postconditions

- User can efficiently review family financial history
- User can find specific transactions quickly
- User has access to detailed transaction information

2.3.7 Transaction Correction and Deletion

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant DB as PostgreSQL
    User->>Web: Click on transaction from list
    Web->>API: GET /transactions/{id}
    API->>DB: Query transaction details
    DB-->>API: Transaction data
    API-->>Web: Transaction details
    Web-->>User: Show transaction view
    User->>Web: Click "Edit"
    Web->>API: GET /categories & GET /accounts
    API-->>Web: Form options
    Web-->>User: Show edit form
    User->>Web: Modify amount and submit
    Web->>API: PATCH /transactions/{id}
    API->>DB: BEGIN transaction
    API->>DB: UPDATE transaction
    API->>DB: RECALCULATE account balance
    API->>DB: COMMIT transaction
    DB-->>API: Update confirmation
    API-->>Web: Success response
    Web-->>User: Show updated transaction
```

Algorithm

1. User selects transaction from list or dashboard
2. System displays transaction details in view mode
3. User enters edit mode to modify transaction
4. System pre-populates form with existing data
5. User makes changes and submits
6. System updates transaction and recalculates balances
7. System confirms changes and updates display

Preconditions

- User is authenticated
- Transaction exists and belongs to user's family
- User has edit permissions

Trigger

User clicks on transaction from list or dashboard, then clicks "Edit" or "Delete".

Basic Flow

1. **Transaction Selection**: User selects transaction to modify
2. **Detail Display**: Show transaction details in view mode
3. **Edit Mode**: Switch to editable form with current values
4. **Modification**: User changes amount, category, date, or description
5. **Validation**: Validate changes before submission
6. **Update Processing**: Update transaction and recalculate balances
7. **Confirmation**: Show success message and updated data

Exception Paths

- **Validation Errors**: Show field-specific error messages
- **Concurrent Modification**: Show "Transaction was modified" warning
- **Delete Confirmation**: Require confirmation before deletion
- **Balance Recalculation Error**: Show error and retry option

Acceptance Criteria

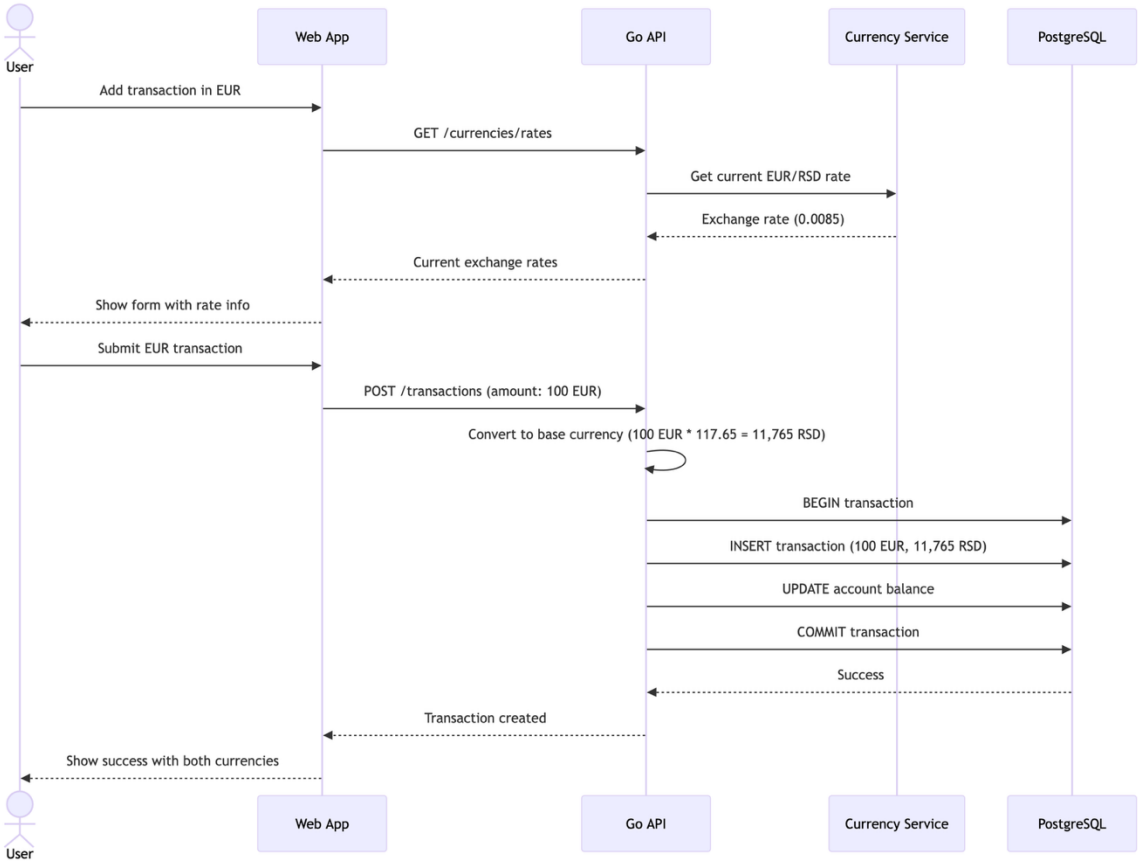
- All transaction fields can be modified except creation date
- Account balances update correctly after modification
- Deletion requires confirmation dialog
- Changes are immediately visible in transaction list
- Edit history is maintained for audit purposes

Postconditions

- Transaction reflects accurate information
- Account balances are correct after changes
- Transaction history maintains data integrity
- Audit log contains modification record

2.3.8 Multi-Currency Transaction Handling

Sequence diagram



Mermaid code:

```
sequenceDiagram
    actor User
    participant Web as Web App
    participant API as Go API
    participant CurrencyAPI as Currency Service
    participant DB as PostgreSQL

    User->>Web: Add transaction in EUR
    Web->>API: GET /currencies/rates
    API->>CurrencyAPI: Get current EUR/RSD rate
    CurrencyAPI-->>API: Exchange rate (0.0085)
    API-->>Web: Current exchange rates
    Web-->>User: Show form with rate info

    User->>Web: Submit EUR transaction
    Web->>API: POST /transactions (amount: 100 EUR)
    API->>API: Convert to base currency (100 EUR * 117.65 = 11,765 RSD)
    API->>DB: BEGIN transaction
    API->>DB: INSERT transaction (100 EUR, 11,765 RSD)
    API->>DB: UPDATE account balance
    API->>DB: COMMIT transaction
    DB-->>API: Success
    API-->>Web: Transaction created
    Web-->>User: Show success with both currencies
```

Algorithm

1. User selects non-base currency for transaction
2. System fetches current exchange rates
3. System displays conversion rate to user
4. User enters amount in selected currency
5. System converts to family base currency
6. System stores both original and converted amounts
7. System updates account balance in base currency

Preconditions

- User is authenticated
- Exchange rate service is available
- Family has accounts in multiple currencies

Trigger

User selects EUR currency when adding transaction (family base is RSD).

Basic Flow

1. **Currency Selection**: User chooses transaction currency
2. **Rate Retrieval**: System gets current exchange rate
3. **Rate Display**: Show conversion rate to user
4. **Amount Entry**: User enters amount in selected currency
5. **Conversion**: System calculates base currency equivalent
6. **Storage**: Store both original and converted amounts
7. **Balance Update**: Update account balance in base currency

Exception Paths

- **Rate Service Unavailable**: Use cached rates with warning
- **Invalid Currency**: Default to base currency
- **Conversion Error**: Show error and require base currency
- **Rate Fluctuation**: Show rate update notification

Acceptance Criteria

- Accurate currency conversion using current rates
- Both original and converted amounts stored
- Account balances maintained in family base currency
- Exchange rates updated regularly
- Conversion rate displayed to user before submission

Postconditions

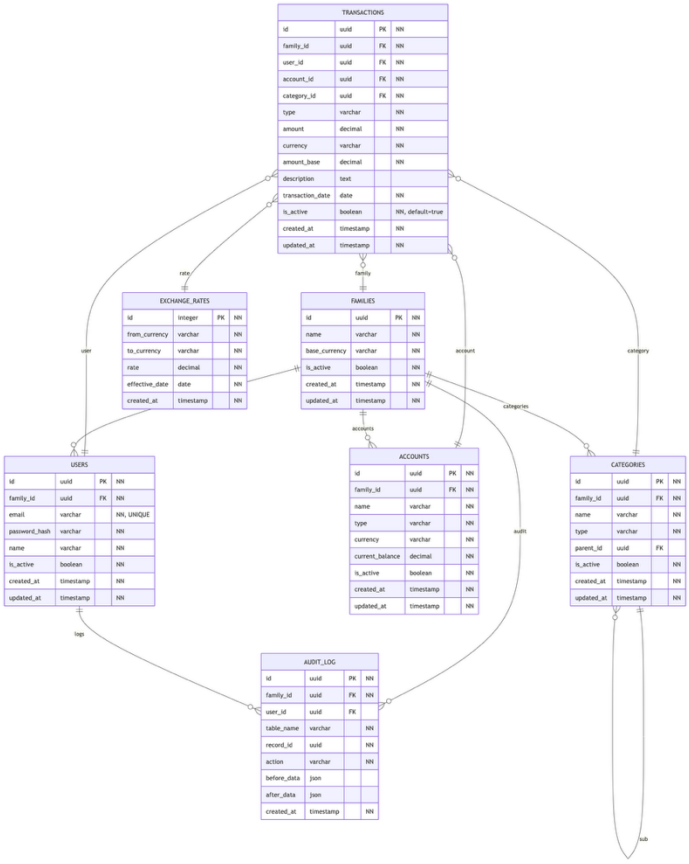
- Transaction recorded in both currencies
- Account balance accurately reflects converted amount
- Currency information preserved for reporting
- Exchange rate used is logged for audit

2.4 Data Model

2.4.1 Financial Data Management

Data model schema

ER diagram:



Mermaid code:

```
erDiagram
    FAMILIES {
      id              uuid      PK  "NN"
      name            varchar       "NN"
      base_currency   varchar       "NN"
      is_active       boolean       "NN"
      created_at      timestamp     "NN"
      updated_at      timestamp     "NN"
    }

    USERS {
      id              uuid      PK  "NN"
      family_id       uuid      FK  "NN"
      email           varchar       "NN, UNIQUE"
      password_hash   varchar       "NN"
      name            varchar       "NN"
      is_active       boolean       "NN"
      created_at      timestamp     "NN"
      updated_at      timestamp     "NN"
    }
```

```
ACCOUNTS {
  id              uuid      PK  "NN"
  family_id       uuid      FK  "NN"
  name            varchar       "NN"
  type            varchar       "NN"
  currency        varchar       "NN"
  current_balance decimal       "NN"
  is_active       boolean       "NN"
  created_at      timestamp     "NN"
  updated_at      timestamp     "NN"
}

CATEGORIES {
  id              uuid      PK  "NN"
  family_id       uuid      FK  "NN"
  name            varchar       "NN"
  type            varchar       "NN"
  parent_id       uuid      FK
  is_active       boolean       "NN"
  created_at      timestamp     "NN"
  updated_at      timestamp     "NN"
}

TRANSACTIONS {
  id              uuid      PK  "NN"
  family_id       uuid      FK  "NN"
  user_id         uuid      FK  "NN"
  account_id      uuid      FK  "NN"
  category_id     uuid      FK  "NN"
  type            varchar       "NN"
  amount          decimal       "NN"
  currency        varchar       "NN"
  amount_base     decimal       "NN"
  description     text
  transaction_date date         "NN"
  is_active       boolean       "NN, default=true"
  created_at      timestamp     "NN"
  updated_at      timestamp     "NN"
}

EXCHANGE_RATES {
  id              integer   PK  "NN"
  from_currency   varchar       "NN"
  to_currency     varchar       "NN"
  rate            decimal       "NN"
  effective_date  date          "NN"
  created_at      timestamp     "NN"
}
```

```
AUDIT_LOG {
  id              uuid      PK  "NN"
  family_id       uuid      FK  "NN"
  user_id         uuid      FK
  table_name      varchar       "NN"
  record_id       uuid          "NN"
  action          varchar       "NN"
  before_data     json
  after_data      json
  created_at      timestamp     "NN"
}


TRANSACTIONS }o--|| FAMILIES       : "family"
TRANSACTIONS }o--|| USERS          : "user"
TRANSACTIONS }o--|| ACCOUNTS       : "account"
TRANSACTIONS }o--|| CATEGORIES     : "category"
TRANSACTIONS }o--|| EXCHANGE_RATES : "rate"

FAMILIES   ||--o{ USERS        : "users"
FAMILIES   ||--o{ ACCOUNTS     : "accounts"
FAMILIES   ||--o{ CATEGORIES   : "categories"
FAMILIES   ||--o{ AUDIT_LOG    : "audit"

USERS      ||--o{ AUDIT_LOG    : "logs"

CATEGORIES ||--o{ CATEGORIES   : "sub"
```

Table: ***families***

Description

Represents a family unit that shares financial data. All financial information is scoped to family level.

Data model

Name	Type	Required	Description	Validation
id	UUID	Yes	Unique family identifier	Primary key
name	VARCHAR(255)	Yes	Family name (e.g., "Kudinov Family")	Length 1-255 chars
base_currency	VARCHAR(3)	Yes	Primary currency for calculations (RSD/EUR)	IN ('RSD', 'EUR')
is_active	BOOLEAN	Yes	Family account status	Default TRUE
created_at	TIMESTAMP	Yes	Record creation time	Auto-generated
updated_at	TIMESTAMP	Yes	Record last update time	Auto-updated

Table: *users*

Description

Family members who have access to shared financial data.

Data model

Name	Type	Required	Description	Validation
id	UUID	Yes	Unique user identifier	Primary key
family_id	UUID	Yes	Reference to family	Foreign key to families.id
email	VARCHAR(255)	Yes	Unique email address	UNIQUE, valid email format
password_hash	VARCHAR(255)	Yes	Bcrypt hashed password	Bcrypt hash format
name	VARCHAR(255)	Yes	User display name	Length 1-255 chars
is_active	BOOLEAN	Yes	User account status	Default TRUE
created_at	TIMESTAMP	Yes	Record creation time	Auto-generated
updated_at	TIMESTAMP	Yes	Record last update time	Auto-updated

Table: *accounts*

Description

Financial accounts (cash, bank accounts) managed by the family.

Data model

Name	Type	Required	Description	Validation
id	UUID	Yes	Unique account identifier	Primary key
family_id	UUID	Yes	Reference to family	Foreign key to families.id
name	VARCHAR(255)	Yes	Account display name	Length 1-255 chars
type	VARCHAR(50)	Yes	Account type	IN ('cash', 'checking', 'savings')
currency	VARCHAR(3)	Yes	Account currency	IN ('RSD', 'EUR')
current_balance	DECIMAL(15,2)	Yes	Current account balance	Calculated field, precision 15,2
is_active	BOOLEAN	Yes	Account status	Default TRUE
created_at	TIMESTAMP	Yes	Record creation time	Auto-generated
updated_at	TIMESTAMP	Yes	Record last update time	Auto-updated

Table: *categories*

Description

Transaction categories for income and expense classification with hierarchical support.

Data model

Name	Type	Required	Description	Validation
id	UUID	Yes	Unique category identifier	Primary key
family_id	UUID	Yes	Reference to family	Foreign key to families.id
name	VARCHAR(255)	Yes	Category display name	Length 1-255 chars
type	VARCHAR(20)	Yes	Category type	IN ('income', 'expense')
parent_id	UUID	No	Reference to parent category	Foreign key to categories.id
is_active	BOOLEAN	Yes	Category status	Default TRUE
created_at	TIMESTAMP	Yes	Record creation time	Auto-generated
updated_at	TIMESTAMP	Yes	Record last update time	Auto-updated

Table: *transactions*

Description

Core financial transactions (income, expenses) recorded by family members.

Data model

Name	Type	Required	Description	Validation
id	UUID	Yes	Unique transaction identifier	Primary key
family_id	UUID	Yes	Reference to family	Foreign key to families.id
user_id	UUID	Yes	User who created transaction	Foreign key to users.id
account_id	UUID	Yes	Account involved in transaction	Foreign key to accounts.id
category_id	UUID	Yes	Transaction category	Foreign key to categories.id
type	VARCHAR(20)	Yes	Transaction type	IN ('income', 'expense')
amount	DECIMAL(15,2)	Yes	Transaction amount (always positive)	0, precision 15,2
currency	VARCHAR(3)	Yes	Transaction currency	IN ('RSD', 'EUR')
amount_base	DECIMAL(15,2)	Yes	Amount in family base currency	0, precision 15,2
description	TEXT	No	Optional transaction description	Max 1000 chars
transaction_date	DATE	Yes	Date when transaction occurred	<= current_date
created_at	TIMESTAMP	Yes	Record creation time	Auto-generated
updated_at	TIMESTAMP	Yes	Record last update time	Auto-updated

Table: *exchange_rates*

Description

Currency exchange rates for multi-currency transaction support.

Data model

Name	Type	Required	Description	Validation
id	INTEGER	Yes	Unique exchange rate identifier	Primary key, auto-increment
from_currency	VARCHAR(3)	Yes	Source currency code	IN ('RSD', 'EUR')
to_currency	VARCHAR(3)	Yes	Target currency code	IN ('RSD', 'EUR')
rate	DECIMAL(10,6)	Yes	Exchange rate value	0, precision 10,6
effective_date	DATE	Yes	Date when rate is effective	Valid date
created_at	TIMESTAMP	Yes	Record creation time	Auto-generated

Table: *audit_log*

Description

Tracks all significant changes to financial data for accountability and debugging.

Data model

Name	Type	Required	Description	Validation
id	UUID	Yes	Unique audit record identifier	Primary key
family_id	UUID	Yes	Reference to family	Foreign key to families.id
user_id	UUID	No	User who made the change	Foreign key to users.id
table_name	VARCHAR(100)	Yes	Database table affected	Valid table name
record_id	UUID	Yes	ID of affected record	Valid UUID
action	VARCHAR(20)	Yes	Action performed	IN ('INSERT', 'UPDATE', 'DELETE')
before_data	JSON	No	Data before change	Valid JSON
after_data	JSON	No	Data after change	Valid JSON
created_at	TIMESTAMP	Yes	When change occurred	Auto-generated

2.4.2 Database Indexes and Performance

Critical Indexes

Essential indexes for application performance and data integrity.

Table	Index Name	Columns	Type	Purpose
users	idx_users_email	email	UNIQUE	Authentication, email uniqueness
users	idx_users_family	family_id	BTREE	Family user lookup
transactions	idx_transactions_family_date	family_id, transaction_date	BTREE	Monthly reports, dashboard
transactions	idx_transactions_account	account_id	BTREE	Account balance calculation
transactions	idx_transactions_category	category_id	BTREE	Category reports
transactions	idx_transactions_user	user_id	BTREE	User transaction history
accounts	idx_accounts_family	family_id	BTREE	Family accounts lookup
categories	idx_categories_family_type	family_id, type	BTREE	Category filtering
exchange_rates	idx_rates_currency_date	from_currency, to_currency, effective_date	BTREE	Rate lookup
audit_log	idx_audit_family_table	family_id, table_name	BTREE	Audit queries

Performance Considerations

- **Transactions table**: Partitioning by transaction_date for large datasets
- **Current_balance**: Maintained via triggers, not calculated on-demand
- **Exchange rates**: Cache frequently used rates in application
- **Audit log**: Archive old records periodically

2.4.3 Data Validation Rules

Business Rules and Constraints

Table	Field	Validation Rule	Error Message
transactions	amount	CHECK (amount > 0)	"Transaction amount must be positive"
transactions	type	CHECK (type IN ('income', 'expense'))	"Invalid transaction type"
transactions	currency	CHECK (currency IN ('RSD', 'EUR'))	"Unsupported currency"
transactions	transaction_date	CHECK (transaction_date <= CURRENT_DATE)	"Future dates not allowed"
accounts	type	CHECK (type IN ('cash', 'checking', 'savings'))	"Invalid account type"
accounts	currency	CHECK (currency IN ('RSD', 'EUR'))	"Unsupported currency"
accounts	current_balance	Calculated field	"Balance cannot be manually set"
categories	type	CHECK (type IN ('income', 'expense'))	"Invalid category type"
families	base_currency	DEFAULT 'RSD', CHECK (base_currency = 'RSD')	"MVP: Only RSD supported as base currency"
exchange_rates	rate	CHECK (rate > 0)	"Exchange rate must be positive"
users	email	UNIQUE constraint	"Email already exists"

Data Integrity Rules

- **Family isolation**: All data access filtered by family_id
- **Soft deletes**: Use is_active flag for logical deletion (transactions, accounts, categories, users)
- **Audit trail**: All CUD operations logged in audit_log table
- **Balance consistency**: Account balances recalculated via triggers
- **Currency consistency**: Base currency amounts always maintained

2.4.4 Database Triggers and Automation

Balance Calculation Trigger

```
-- Automatically update account balance when transaction is inserted/updated/deleted
CREATE OR REPLACE FUNCTION update_account_balance()
RETURNS TRIGGER AS $$
BEGIN
    -- Recalculate account balance based on all transactions
    UPDATE accounts
    SET current_balance = (
        SELECT COALESCE(
            SUM(CASE
                WHEN t.type = 'income' THEN t.amount_base
                WHEN t.type = 'expense' THEN -t.amount_base
            END), 0)
        FROM transactions t
        WHERE t.account_id = COALESCE(NEW.account_id, OLD.account_id)
    )
    WHERE id = COALESCE(NEW.account_id, OLD.account_id);

    RETURN COALESCE(NEW, OLD);
END;
```

Audit Log Trigger

```
-- Automatically log all changes to financial data
CREATE OR REPLACE FUNCTION audit_trigger()
RETURNS TRIGGER AS $$
BEGIN
    INSERT INTO audit_log (
        family_id, user_id, table_name, record_id, action,
        before_data, after_data, created_at
    ) VALUES (
        COALESCE(NEW.family_id, OLD.family_id),
        CURRENT_SETTING('app.current_user_id', true)::UUID,
        TG_TABLE_NAME,
        COALESCE(NEW.id, OLD.id),
        TG_OP,
        CASE WHEN TG_OP != 'INSERT' THEN row_to_json(OLD) END,
        CASE WHEN TG_OP != 'DELETE' THEN row_to_json(NEW) END,
        NOW()
    );

    RETURN COALESCE(NEW, OLD);
END;
```

2.5 Metrics and Alerts

2.5.1 Metrics

Critical monitoring metrics for MVP operation.

 Essential System Metrics

Service	Metric name	Alert Threshold	Description
Go API	API Health	<95% success rate	System availability
Go API	Response Time	3000ms (95th percentile)	User experience
PostgreSQL	Connection Health	<5 available connections	Database capacity
Authentication	Login Success	<90% success rate	Auth system health
Transactions	Processing Errors	1% failure rate	Business logic reliability
Currency	Rate Updates	2 failures/hour	Multi-currency support

2.5.2 Alerts

Essential alerts for MVP system health.

Critical Alerts

- **System Down**: API health check fails >2 minutes
- **Database Unavailable**: PostgreSQL connection fails >1 minute
- **Transaction Failures**: >5% transaction processing errors in 10 minutes
- **Authentication Issues**: >20 failed logins in 2 hours

Alert Delivery (MVP)

- **Application Logs**: Structured logging with alert severity
- **Console Output**: Critical alerts only
- **External Monitoring**: Standard HTTP response codes indicate API health

3. Non-functional Requirements

3.1 Configuration

Environment Configuration:

- **Development**: Local Go server with local PostgreSQL database
- **Production**: Single Docker container with configurable PostgreSQL connection

Application Configuration:

- **Database**: Connection URL, pool size (default: 10 connections)
- **JWT**: Secret key, expiration time (default: 24 hours)
- **Currency API**: Update frequency (default: daily), fallback rates
- **Server**: Port (default: 8080), CORS settings for web client

Security Configuration:

- **Password Policy**: Minimum 8 characters (configurable)
- **Rate Limiting**: 100 requests per minute per user (configurable)
- **Session Timeout**: 24 hours (configurable)

Reference Data Management (MVP):

- **Categories**: Pre-configured via SQL migration scripts
- **Currencies**: RSD and EUR supported via database configuration
- **Account Types**: Configured during database initialization
- **Post-MVP**: Administrative UI for reference data management

3.2 General Non-functional Requirements

Parallel Work of Multiple Users

Family Data Access:

The MVP system supports concurrent access by family members with proper data isolation:

- **Family Isolation**: All database queries include family_id filtering to prevent cross-family data access
- **Concurrent Transactions**: PostgreSQL transactions ensure account balance consistency
- **Session Management**: Multiple family members can be logged in simultaneously
- **Data Consistency**: Account balances are calculated atomically during transaction creation

Conflict Resolution (Basic):

- **Account Updates**: Last-write-wins for account balance modifications
- **Concurrent Entry**: No special handling for simultaneous transaction entry (rare in family context)

Audit Log Storage and Management

Essential Audit Trail:

Track critical financial operations for accountability and troubleshooting.

Logged Actions (MVP):

- **User Authentication**: Login attempts and password changes
- **Financial Transactions**: Creation, modification, deletion of transactions
- **Account Changes**: Balance updates and account modifications

Audit Log Structure:

- **Event Metadata**: Timestamp, user_id, family_id, action type
- **Data Changes**: Before/after values for change tracking
- **Retention**: 1-year retention (sufficient for MVP)

Performance, Scalability, and Reliability Expectations

Performance Requirements:

- **API Response Time**: <2 seconds for standard operations (matches BRD requirement)
- **Page Load Time**: <3 seconds for web interface
- **Database Queries**: <500ms for individual operations

Scalability Targets (MVP):

- **Concurrent Users**: Support 10 simultaneous family users
- **Data Volume**: Handle 1,000+ transactions per family efficiently
- **Database Size**: Accommodate up to 100MB of financial data

Reliability Standards:

- **System Availability**: 95% uptime during development/testing
- **Data Integrity**: Zero financial data loss with database ACID compliance
- **Error Recovery**: Graceful degradation when external services unavailable

Offline Behavior (MVP):

- The system does not support full offline mode.
- When the network is unavailable, the client must show a clear error message and prevent unsynchronized data from being lost silently.
- No sensitive financial data is required to be stored locally on client devices beyond standard browser caching.

Security and Compliance Notes

Data Security (MVP):

- **Encryption in Transit**: All API communications over HTTPS
- **Password Security**: Bcrypt hashing with 12 rounds minimum
- **Session Security**: JWT tokens with family context, secure storage

Authentication and Authorization:

- **Family-based Access**: Users only access their family's financial data
- **JWT Validation**: All API endpoints validate JWT tokens
- **Rate Limiting**: Basic protection against brute force attacks

Privacy and Compliance:

- **Data Minimization**: Collect only necessary financial information
- **Data Deletion**: Family data can be permanently deleted on request
- **Post-MVP**: Advanced data export and compliance features

Operational Security (MVP):

- **Input Validation**: Prevent SQL injection and XSS attacks
- **Error Handling**: Don't expose sensitive information in error messages
- **Logging**: Security events logged for review

Post-MVP Security Features:

- **Multi-factor Authentication**: Enhanced account security
- **Database Encryption**: Field-level encryption for sensitive data
- **Advanced Monitoring**: Real-time security monitoring and alerting