**RBS Coding Challenge**

**STORY**

As a bank client,

I want to see a list of all transactions that occurred during a given month on one of my account

so that I can check the details (date, amount, currency and description) and the monthly balance

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**SPECIFICATIONS**

the API will return for a given account and for a given calendar month:

* the list of all transactions
* the total amount (balance) in GBP
* Results are paginated.

Each transaction, in JSON format, provides:

* Unique ID
* Amount with currency (e.g. GBP 100, CHF 75)
* Account iban (CH93-0000-0000-0000-0000-0)
* Value date (e.g. 01-10-2020)
* Description

***Assumption****: for a given account, all transactions are in the same currency as the account.*

One client has one or more accounts, possibly in different currencies (GBP or EUR or CHF)

Each client has a unique identity key (format = P-0123456789)

For the monthly balance calculation, when transactions are not in GBP, total monthly amount will be converted in GBP. The exchange rate will be provided by an external API, for the current date.

For purpose of this coding challenge, we consider that the user is already logged-in (authentication done), but transactions extraction (authorization) must be checked against the user’s unique identity key contained in a JWT token send by API request.

All transactions are available in Kafka:

* Key = transaction unique ID
* Value = JSON transaction format

Technical requirements:

* Java 11
* Spring libraries
* Using
  + Kafka
  + Postgres database
  + CI/CD – Jenkins
  + Docker / Kubernetes
  + Serenity
* API is stable and able to support a minimum of 2 instances to scale horizontally

Data set:

* 100’000 clients
* Around 1’000 transactions / months / client
* 3 years

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**DELIVERABLES**

* Requirements and functional specifications doc [This document]
* API contract - Swagger
* C4 model context
* database schema
* technical description
  + JWT
  + external API for exchange rate
  + used Spring libraries
  + Kafka
  + Jenkins + Docker / Kubernetes
* demo app architecture
* source code (Git repo)
* (Serenity) Test report

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| **Tasks** | **Owner** |
| Setup repository and project structure | LS |
| Setup environment |  |
| Setup docker swarm | LS |
| Setup Jenkins pipeline | TP |
| Design PodstgreSQL Database | PS |
| Design API endpoints | LS |
| Design endpoints in swagger | LS |
| Connect Kafka with PostgreSQL |  |
| setup example project with Spring data | KT |
| setup example project with Spring Kafka | GW |
| implement pagination | TP |
| Feed Kafka with 100K of transactions |  |
| generate test data | PS |
| create Integration test cases based on MrChecker | KS |
| Create and execute tests | KS |
| Add coverage information | TP |
| Handle JWT token-based authentication |  |
| C4 architecture model | LS |
| Documentation | LS-PS |

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**FUNCTIONAL ACCEPTANCE CRITERIA**

**WHEN** user binds GET: /clients/{c\_id}/accounts/{a\_id}/transactions?date={date}

{c\_id} = client unique id

{a\_id} = account unique id

{date} = calendar year and month (YYYY-MM). E.g. 2020-10

Request header contains JWT token with minimal payload containing the user unique identity key (JSON format). Example

{

"identity\_key": " P-0123456789"

}

**THEN**

**IF** identity\_key and {c\_id} don’t match with data available in *customer* database table

**OR IF** {c\_id} and {a\_id} don’t match with data available in *account* database table

**OR IF** identity\_key OR {c\_id} OR {a\_id} doesn’t exist in database table

System returns HTTP code 401-UNAUTHORIZED

**THEN**

**IF** {date} doesn’t match the expected format

System returns HTTP code 400-BAD REQUEST

**THEN**

**IF** identity\_key and {c\_id} match with data available in *customer* database table

**AND IF** {c\_id} and {a\_id} match with data available in *account* database table

**AND IF** {date} matches the expected format

System returns HTTP code 200-OK

System returns list of available transactions for the given month {date} and given account {a\_id} in JSON format. Example:

RESPONSE:

{

“transactions”: [

{ “Id”: 1,

“amount”: “GBP 100”,

“iban”: “CH93-0000-0000-0000-0000-0”,

“value\_date”: “01-10-2020”,

“description”: “online payment GBP”

},

{ “Id”: 2,

“amount”: “GBP 153.23”,

“iban”: “CH93-0000-0000-0000-0000-0”,

“value\_date”: “02-10-2020”,

“description”: “online payment GBP”

}

],

“balance”: “GBP 253.23”

}

In case no transaction available for the given month, RESPONSE is

{

“transactions”: [],

“balance”: “GBP 0”

}

In case transactions’ currency is not GBP, monthly balance is converted to GBP, RESPONSE is

{

“transactions”: [

{ “Id”: 1,

“amount”: “**CHF 200**”,

“iban”: “CH93-0000-0000-0000-0000-0”,

“value\_date”: “01-10-2020”,

“description”: “online payment CHF”

},

{ “Id”: 2,

“amount”: “**CHF 100**”,

“iban”: “CH93-0000-0000-0000-0000-0”,

“value\_date”: “02-10-2020”,

“description”: “online payment CHF”

}

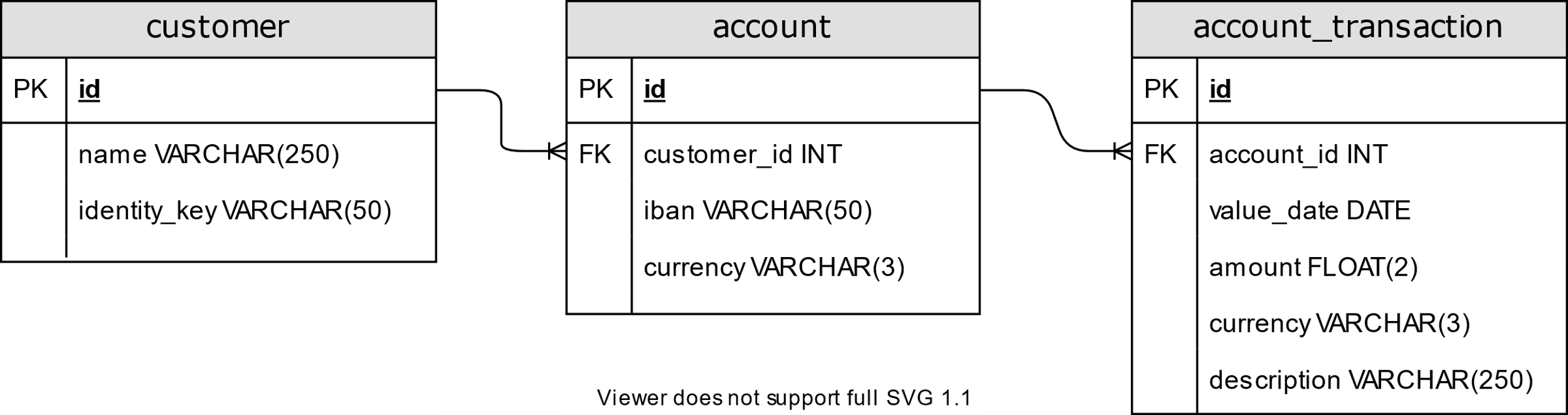
],

“balance”: “**GBP** 253.89”

}

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**DATABASE MODEL**



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