bds-db-design: BPC-BDS Project Assignment 1

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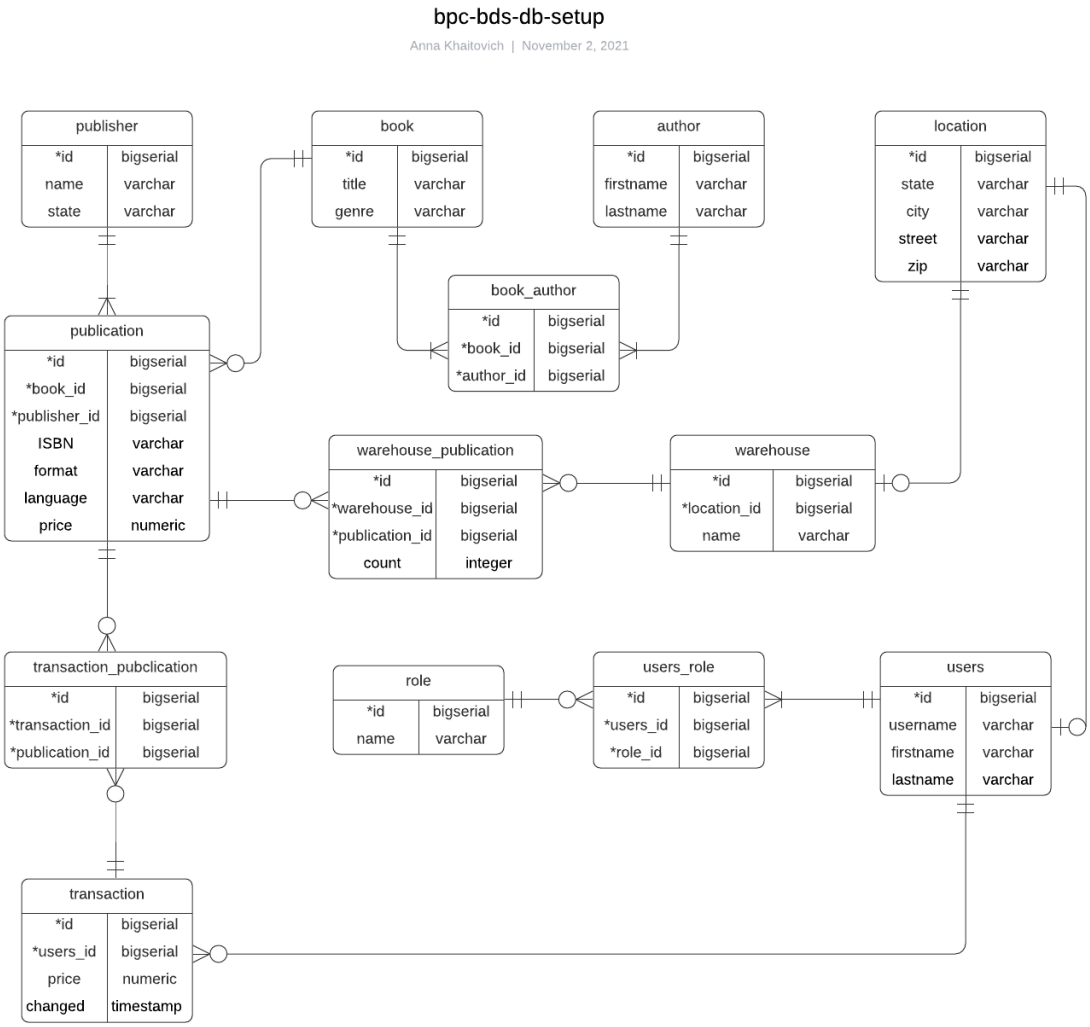
1 Introduction

The idea of this database design project was to create a database that could be used to store business data for a book e-shop. The e-shop distributes books (both printed - in different formats - and e-books) to their clients and handles both sales and logistics parts of the purchase. This is important to store the following data:

- list of products (books): their author(s), available publication(s) and a genre that book might belong to. For publications, store list of different availables ISBN of each book along with it's format, language, publisher, available locations (warehouses) and offering price.
- list of warehouses that belong to the e-shop, along with their locations (full address - state, city, street and ZIP code)
- list of user accounts, that should have a unique username, first and last name of the user and a role attached to them. Available roles should be: admin (highest level of acces), staff (reserved for the e-shop's employees), VIP user (a user that has bought the VIP subscription) and a common user.
- list of transaction executed by the e-shop, including the information about the publication that was sold, the user that has bought it, the price it was sold for and a timestamp indicating the last time any data about the transaction was changed.
- optionally, the database could allow accounts to store data about a location the account is attached to - for VIP and common users that would be the desired shipping address, for staff and admin accounts that could be the warehouse/office address they are assigned to. This feature donesn't have to be implemented in the first version and may be delievered later as a patch.

2 ERD



3 GitHub Repository

The GitHub repository is located and the following link - `https://github.com/akhait/bds-db-design`.

4 Tables

4.1 Book

A book is defined as a literature piece that was written by a certain author, printed and distributed by certain publisher, and could belong to a certain genre.

4.2 Author

An author is defined as a person that could be addressed by a first name and a last name (real or an artistic pseudonym) and from a certain origin.

4.3 Book_author

Book_author table represents a many-to-many relationship between books and authors. Any author can have any number of books from one and above, and any book can be written by any number of author from one and above.

4.4 Publisher

A publisher is defined as a company, that has published a certain publication. Each publisher company has a name and a state of origin.

4.5 Publication

A publication is defined as the distribution of copies of a work to the public [1]. Each copy of such work (the product - books, in our case) is defined by it's ISBN [2], publisher, format and a language it's published in.

4.6 Location

A location is defined as an address, composed of the state, city, street name and a ZIP code. A location can be a customer's shipping address, warehouse address, etc. - generally, an address of anything.

4.7 Warehouse

A warehouse is defined as a building, where e-shops's products (books) are stored. It can be addressed by it's assigned name and an address it's located at.

4.8 Warehouse_publication

Warehouse_publication table represents a many-to-many relationship between warehouses and publications. Any warehouse can store multiple number of publications, and any publication can be in stock at multiple number of warehouses.

4.9 Users

A user is defined as someone who'd be using the e-shop and accessing it's functionality via a user account, which is identified by a username and that contains such data as user's first and last name, type of account/role and an address (optionally).

4.10 Role

A role is a type of a user account. Available roles are admin (highest level of acces), staff (reserved for the e-shop's employees), VIP user (a user that has bought the VIP subscription) and a common user.

4.11 Users_role

Users_role table represents a many-to-many relationship between users and roles. Any user can have multiple number of roles, and any role can be assigned to multiple number of users.

4.12 Transaction

A transaction is a completed agreement between a buyer and a seller [3], in this case an agreement about exchange of any product(s) for money. Additionally to data about the sold product - publication(s) - and the price it was sold for, a transaction also contains information about a user (buyer), that the transaction was initiated by, and the last date and time the transaction was edited (if never, when it was created).

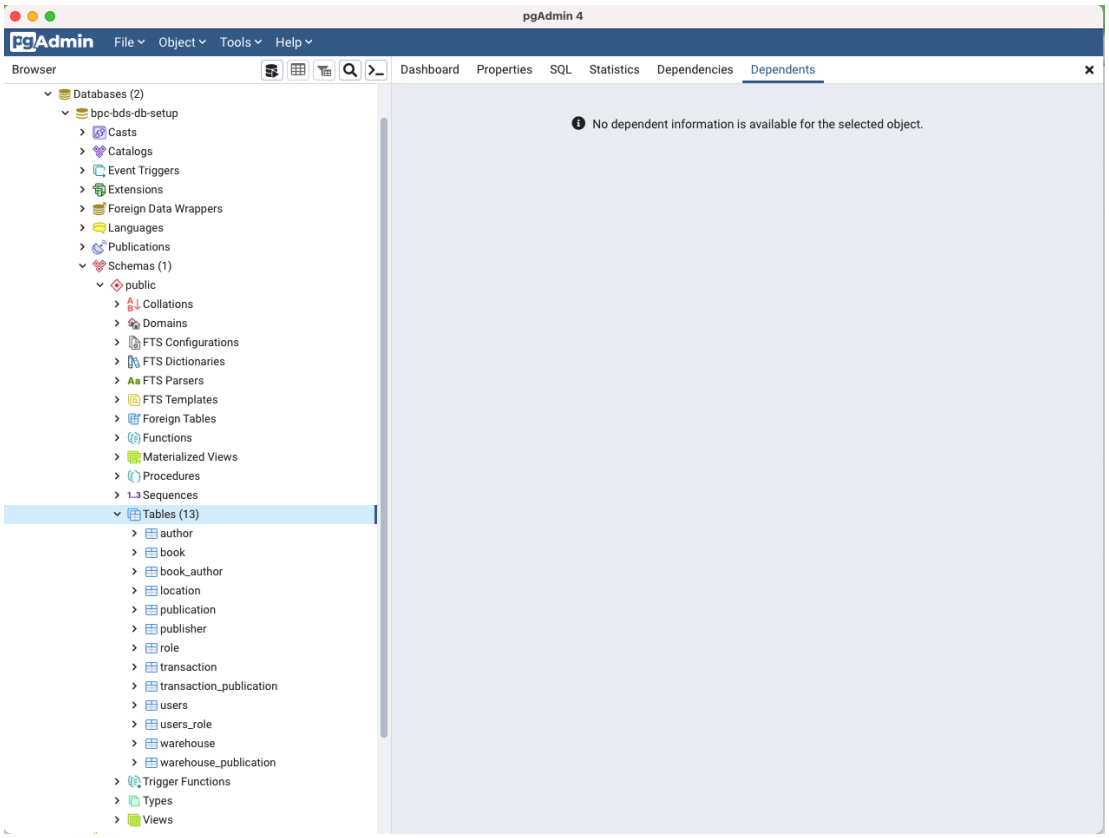
4.13 Transaction_publication

Transaction_publication table represents a many-to-many relationship between transactions and publications. A transaction can have multiple number of publications, and a publication can take part in multiple number of transaction.

5 3rd Normal Form

- **1NF** - each column of a table must have a single value: all columns of all tables have atomic values
- **2NF** - every non candidate-key attribute must depend on the whole candidate key, not just part of it: all table have a private key identifier, which serves as a single candidate key, and all other attributes depend on it.
- **3NF** - there must be no transitive functional dependencies. No transitive functional dependecies are present, all parts of any potential transitive dependencies are implemented as separate tables (ex. publisher table, transaction table, etc.)

6 pgAdmin screenshot of the database



References

[1] The United States Code. *The International ISBN Agency*. URL: `https://en.wikisource.org/wiki/United_States_Code/Title_17/Chapter_1/Section_101#publication`. (accessed: 01.11.2021).

[2] ISBN International. *The International ISBN Agency*. URL: `https://www.isbn-international.org/`. (accessed: 2018).

[3] Investopedia. *Transaction*. URL: `https://www.investopedia.com/terms/t/transaction.asp`. (accessed: 01.11.2021).