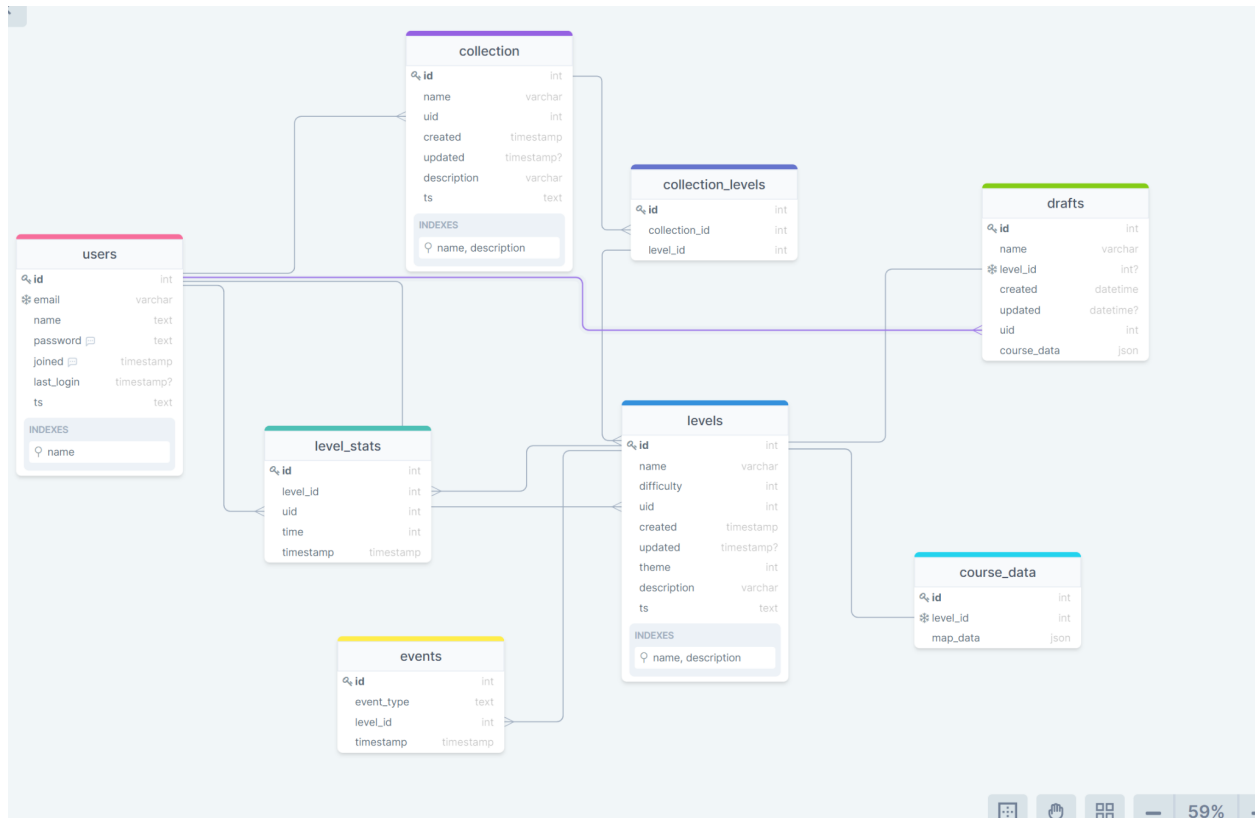# Relational Database Model

Race Maker

Entity - Relationship Diagram

The latest version of this diagram can also be found at
https://drawsql.app/tec-de-monterrey-3/diagrams/reto-tc2005b

A note on integrity restrictions

Unless otherwise noted, all columns have the NOT NULL restriction.

Normal Form

This database model has been normalized to the third normal form as all the tables follow the
following rules:
- No composite/multivalued columns.
- No partial dependencies (all of the columns depend only on the primary key).
- No transitive dependencies.

It's worth noting that our database model breaks away from the relational model and normal forms in some cases, but only because it made more sense for our project or to adopt other relational model best practices, this will be explained further in the table breakdown below.

Table Breakdown

users
This table is essential to the project, as it stores information about the users (players and makers) including login credentials, name, and metadata.

Relationships:
- Collections [One to many]
- Drafts [One to many]
- Levels [One to many]
- Level Stats [One to many]

Integrity restrictions:
- Email must be unique, this is because the email is used as a login credential.
- The joined column is auto generated using CURRENT_TIMESTAMP.
- last_login may be null.

Indexes:
- GIN (full text search) index on name (ts).

Normal form:
Third normal form.
- No composite values.
- No transitive dependencies.
- Partial dependencies
  - All columns depend on both id and email (because of the unique constraint). An exemption to the no partial dependencies rule was made to implement a numeric primary key and have an easier way to identify users in the API and website.

levels
This table is essential to the project, as it stores level information.

Relationships:
- Collections [Many to many]
- Drafts [One to One]
- Course Data [One to One]

- Events [One to many]
- Level Stats [One to many]

Integrity restrictions:
- Updated may be null

Indexes:
- GIN index on name and description (ts).

Normal form:
Third normal form.
- No composite values.
- No transitive dependencies.
- No partial dependencies

collections
Collections allow users to group similar levels together. This table stores information about collections.

Relationships:
- Users [Many to one]
- Levels [Many to many]

Integrity restrictions:
- Updated may be null

Indexes:
- GIN index on name and description (ts).

Normal form:
Third normal form.
- No composite values.
- No transitive dependencies.
- No partial dependencies

drafts
Drafts allow users to save a level (or an edit to a level) before publishing. This table stores draft information, including the track itself.

Relationships:

- Users [Many to one]
- Levels [One to one]

Integrity restrictions:
- Updated may be null
- Level Id may be null (a draft may be created without being associated with a level ie. a blank draft to create a new level).
- Level Id must be unique (to enforce one to one relationship).

Normal form:

Third normal form.
- No composite values.
  - Although some would consider the use of a json column a composite value, we believe it's not in the current context and that it makes sense to use it for our use case, as any other solution would drastically increase complexity and reduce efficiency. This also applies to the json column used in the course_data table.
- No transitive dependencies.
- Partial dependencies
  - Given the uniqueness of Level Id, all columns may depend on both the primary key and level_id when the latter is not null. This does not break the second normal form as level_id may be null (and thus cannot be used as a primary key) and is also used to identify whether a draft belongs to a level or not.

course_data

This table is essential, as it stores the actual level in json format.

Relationships:
- Levels [One to one]

Integrity restrictions:
- Level id must be unique to enforce one to one relationship.

Indexes:
- GIN index on name and description (ts).

Normal form:

Third normal form.
- No composite values.
- No transitive dependencies.
- No partial dependencies.

level_stats
This table acts as a leaderboard for the levels.

Relationships:
- Levels [Many to one]
- Users [Many to one]

Integrity restrictions:
- None

Normal form:

Third normal form.
● No composite values.
● No transitive dependencies.
● No partial dependencies.

events
This table stores generic events sent for analytics purposes, which are used to generate metrics at the level or project level.

Relationships:
- Levels [Many to one]

Integrity restrictions:
- None

Third normal form.
● No composite values.
● No transitive dependencies.
● No partial dependencies.