

# **Technical Report and ERM**

## **DataBase Foundations**

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## **Introduction**

This report presents a detailed design of the Twitch database, the objective of which is to efficiently model the main entities and relationships that support the daily operation of the service. The primary focus is on identifying key platform components such as users, channels, videos, and messaging, as well as critical functionalities related to subscriptions, donations, and interactive events.

Throughout this document, the most important entities that make up the data model are broken down, along with their respective attributes, in order to provide a coherent and adaptable structure.

## **Steps**

Designing an efficient and well-structured database for a platform as complex as Twitch requires a methodical approach. To ensure that all key aspects of the platform are properly represented and that the relationships between the various components are clear, several key steps are followed.

In this process, we begin by identifying the main components that define how Twitch works, such as users, channels, videos, subscriptions, and other critical elements. From these components, we proceed to define the entities that will be responsible for modeling these elements in the database, as well as the attributes that describe the specific characteristics of each entity.

Finally, the information is organized, assigning the corresponding attributes to each entity to ensure the consistency and integrity of the data model, where everything is seen.

## 1. Define components

- a. User Management
- b. Streaming
- c. Video (VOD) Management
- d. Chat System
- e. Subscriptions
- f. Followers
- g. Donations
- h. Moderation
- i. Emotes and Interaction
- j. Reports and Violations

## 2. Define entities

- a. Users (**e1**)
- b. Streams (**e2**)
- c. Videos (VODs) (**e3**)
- d. Categories (**e4**)
- e. Followers (**e5**)
- f. Subscriptions (**e6**)
- g. Chats (**e7**)
- h. Donations (**e8**)
- i. Emotes (**e9**)
- j. Moderators (**e10**)
- k. Reports (**e11**)

## 3. Define attributes per entity

- a. **Users**
  - i. username
  - ii. email
  - iii. password hash
  - iv. account type (streamer/viewer)
  - v. sign up date
  - vi. profile picture v
  - vii. bio
- b. **Streams**
  - i. title
  - ii. category (game/creative/music/etc.)

- iii. start time
- iv. end time
- v. view count
- vi. status (live/offline)
- c. Videos (VODs)**
  - i. video url
  - ii. upload date
  - iii. view count
  - iv. duration
  - v.
- d. Categories**
  - i. name
  - ii. description
- e. Followers**
  - i. follow date
- f. Subscriptions**
  - i. subscription date
  - ii. subscription type (tier1/tier2/tier3)
- g. Chats**
  - i. message
  - ii. timestamp
- h. Donations**
  - i. amount
  - ii. currency
  - iii. donation date
- i. Emotes**
  - i. emote name
  - ii. image url
- j. Moderators**
  - i. assigned date
- k. Reports**
  - i. reason
  - ii. report date
  - iii. status (pending/resolved/closed)

#### **4. Define relationships**

	e1	e2	e3	e4	e5	e6	e7	e8	e9	e10	e11
e1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
e2	✓		✓	✓			✓	✓		✓	
e3	✓	✓		✓							
e4	✓	✓	✓								
e5	✓					✓		✓		✓	✓
e6	✓				✓						
e7	✓	✓						✓	✓	✓	✓
e8	✓	✓			✓		✓				
e9	✓						✓				
e10	✓	✓			✓		✓				✓
e11	✓				✓		✓			✓	

## 5. Define relationships types

### Types

- 1 to many ( 1--- M)
- many to many (M---M)
- 1 to 1 (1---1)

### Users (e1):

- e1 to e2 (Streams): 1---M
- e1 to e3 (Videos): Indirect (through Streams)
- e1 to e4 (Categories): Indirect (through Streams)
- e1 to e5 (Followers): M---M
- e1 to e6 (Subscriptions): M---M
- e1 to e7 (Chats): 1---M
- e1 to e8 (Donations): 1---M
- e1 to e9 (Emotes): M---M
- e1 to e10 (Moderators): 1---M
- e1 to e11 (Reports): 1---M

#### **Streams (e2):**

- e2 to e3to e4 (C (Videos): 1---M
- e2 (Categories): M---1
- e2 to e7 (Chats): 1---M
- e2 to e8 (Donations): 1---M
- e2 to e10 (Moderators): M---M

#### **Videos(e3)**

- e3 to e4 (Categories): M---1

#### **Followers (e5):**

- e5 to e6 (Subscriptions): M—1
- e5 to e8 (Donations): M—1
- e5 to e10 (Moderators): 1—1
- e5 to e11 (Reports):M—M

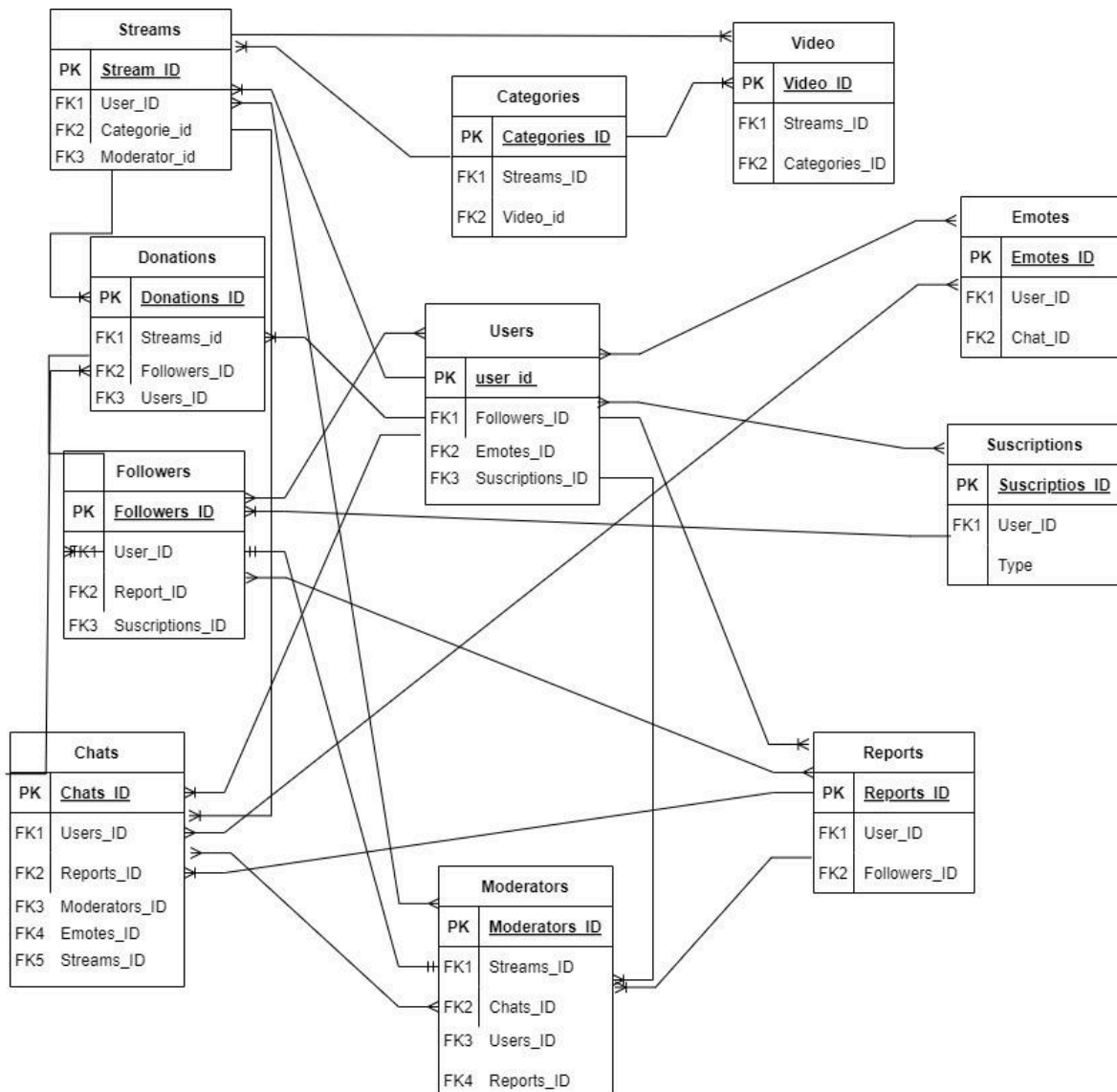
#### **Chats (e7):**

- e7 to e8 (Donations): 1—M
- e7 to e9 (Emotes): M—M
- e7 to e10 (Moderators): M—M
- e7 to e11 (Reports): M—1

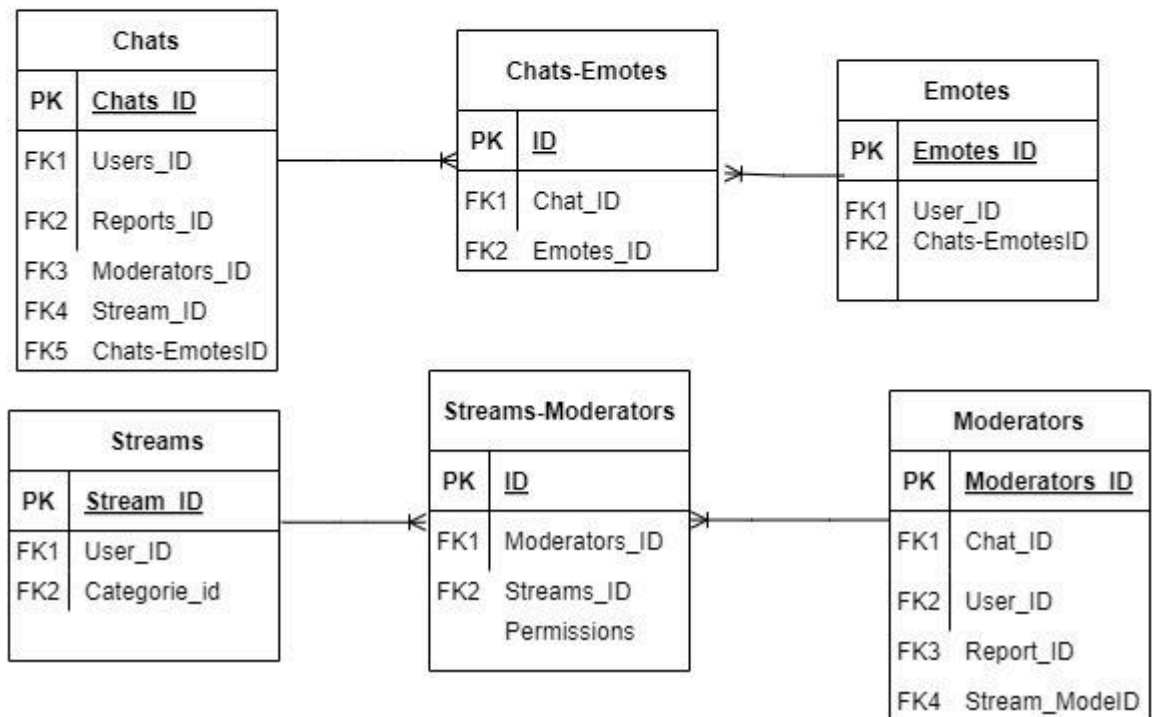
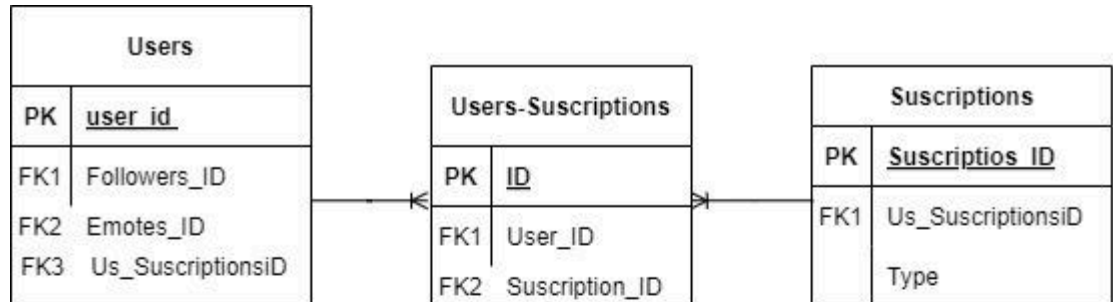
#### **Moderators (e10)**

- e10 to e11(Reports): M—1

## 6. First Entity-Relationship Draw

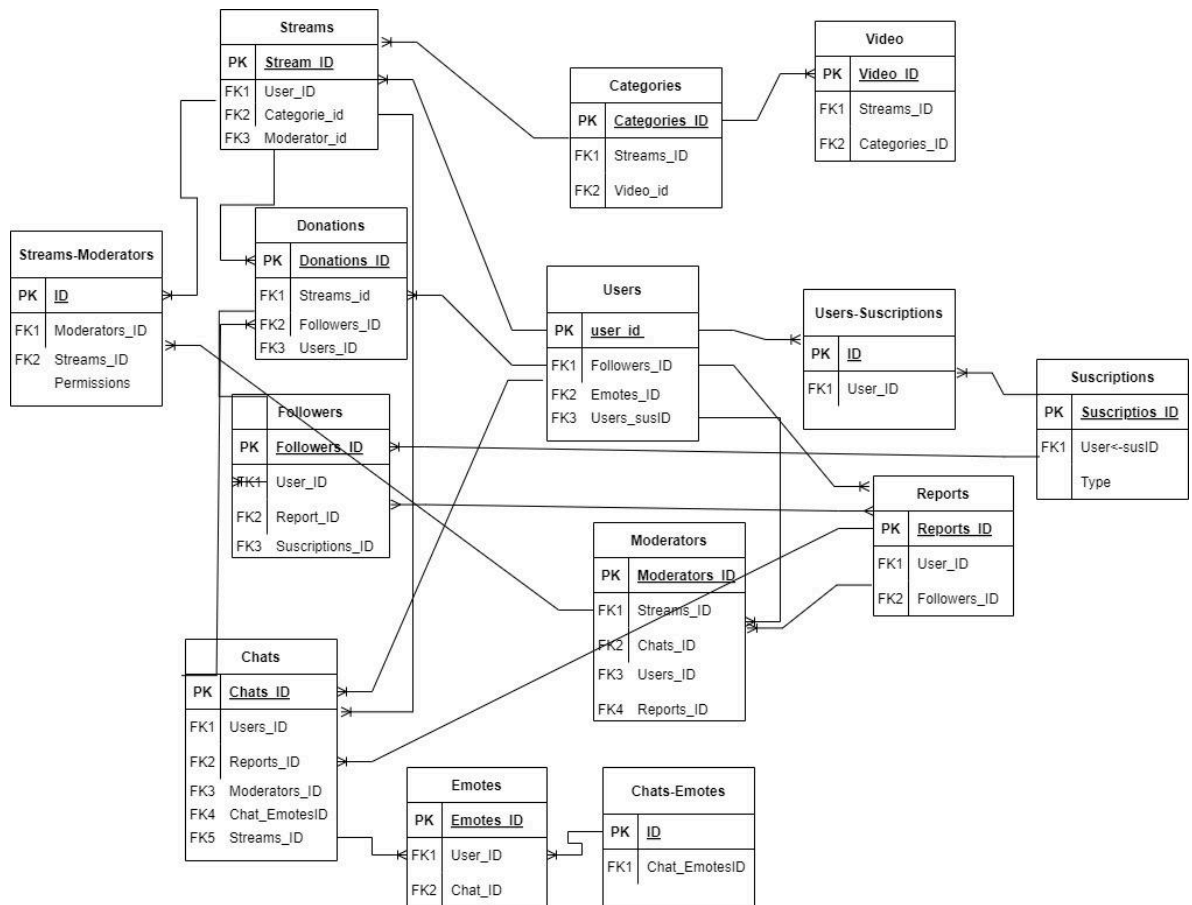


## 7. First Split Many-to-Many Relationships

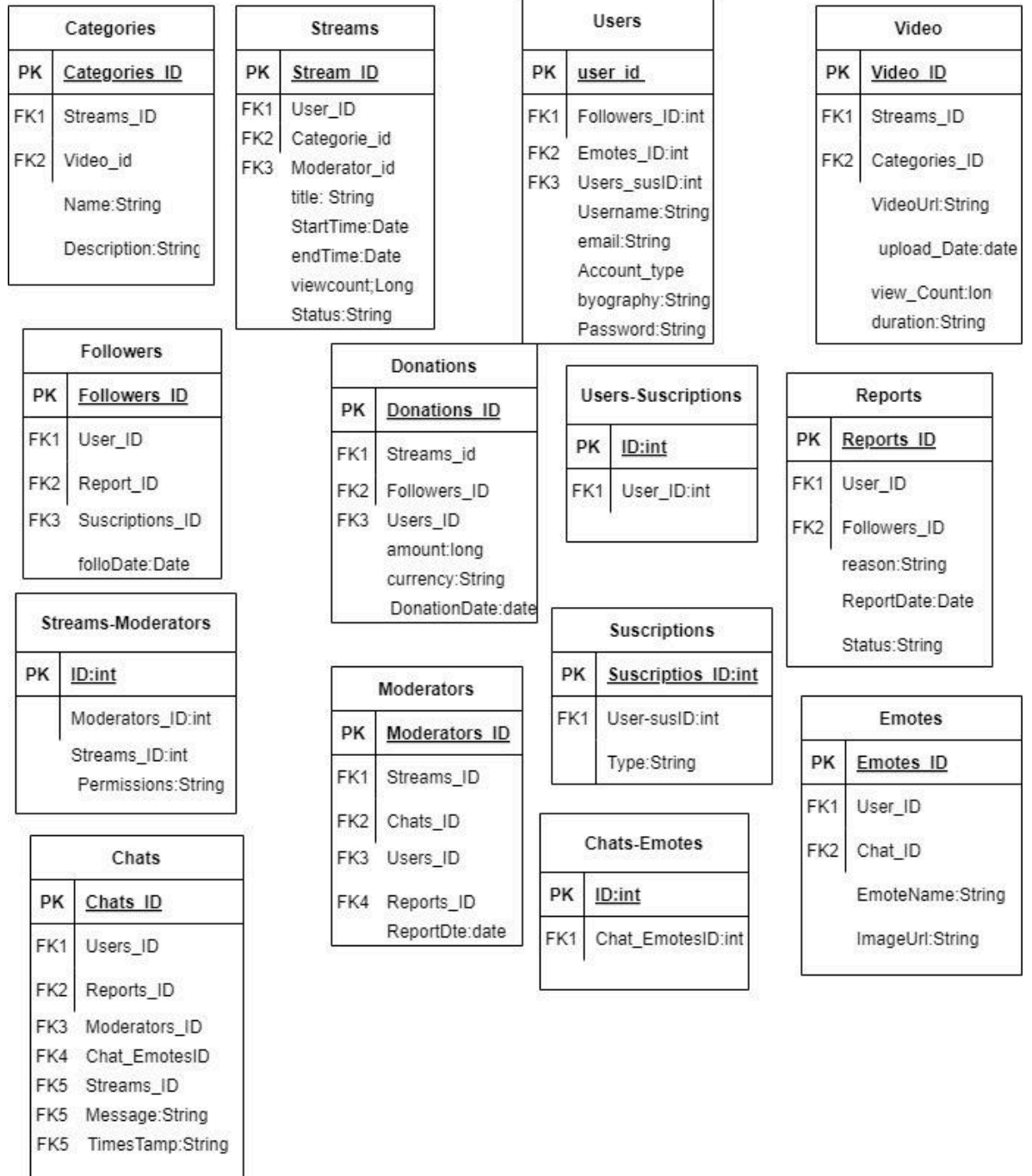




## 8. Second Entity-Relationship Draw



## 9. Get Data-Structure E-R M



## 10. Define Constraints and Properties of Data

