

# BEHIND THE SCROLL: ENGINEERING A SOCIAL VIDEO PLATFORM

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## INTRODUCTION

Short-form video platforms like TikTok have revolutionized **user engagement** by combining personalized content feeds, social interaction, and monetization for creators. While many existing solutions focus heavily on **video delivery and recommendation algorithms**, they often lack scalable support for advertisers and efficient content moderation. Designing a system that balances **performance, monetization, and community safety** remains a major challenge.

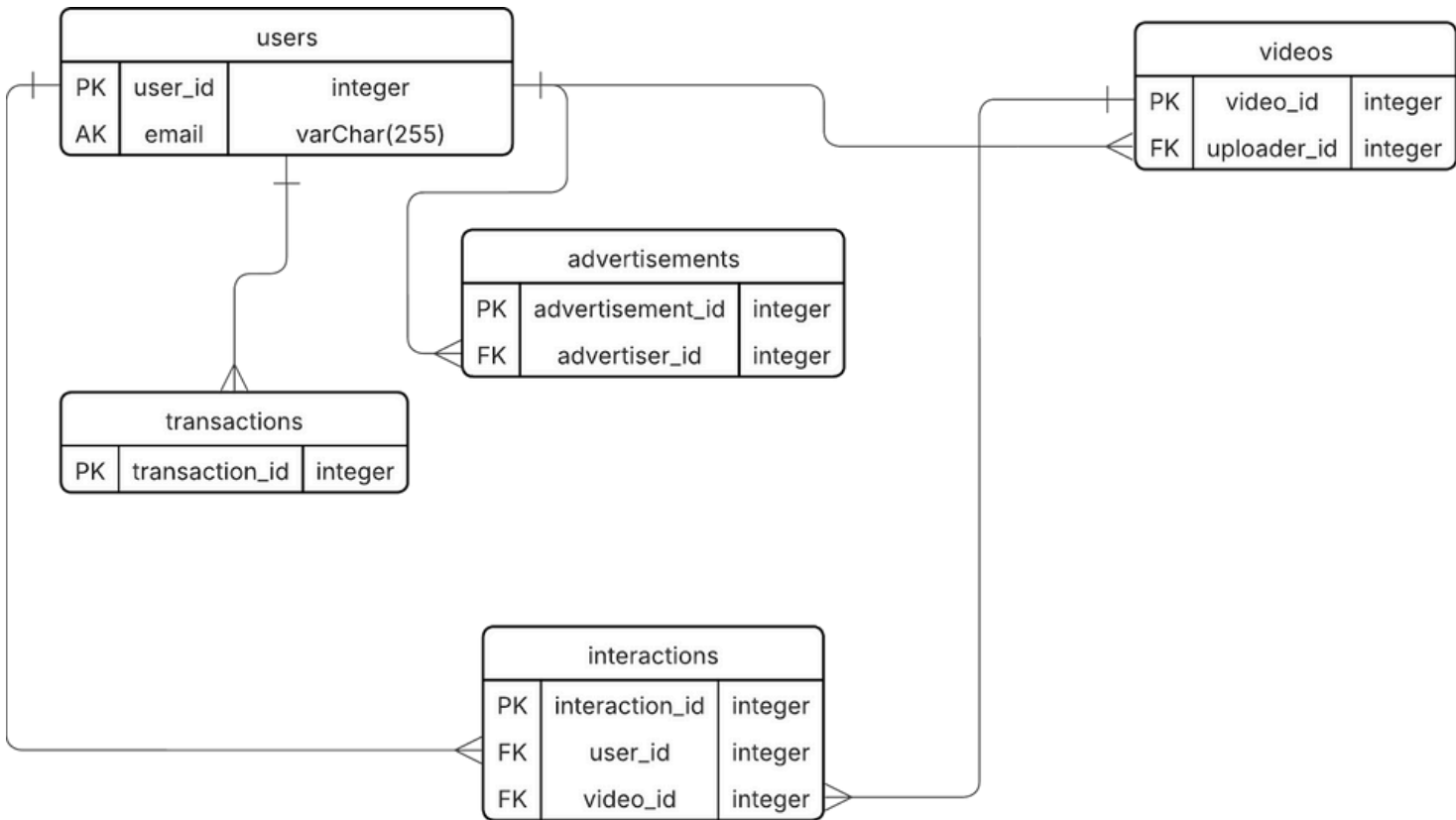
### GOAL

To design a scalable, database-backed social video-sharing platform that supports **user interaction, creator monetization, and targeted advertising**. The expected outcome is an optimized data model and backend structure to support platform functionality at scale.

## PROPOSED SOLUTION

Our solution proposes a robust database architecture combining **relational and NoSQL elements**. Core components include **users, videos, interactions, payments, ad campaigns, and content reports**. The system emphasizes personalization through indexed search, scalable storage for video data, and a role-based interaction model (Users, Creators, Advertisers, Admins).

E-R Diagram



## EXPERIMENTS

We conducted data modeling and performance estimations based on user **stories and expected activity**:

1

- Simulated 10,000 Daily Active Users (DAU)
- Estimated 1,429 daily video uploads

2

- Calculated 429 GB/month of video storage

3

- Validated data relations through E-R modeling and cardinality design

4

- Defined key database operations: CRUD for videos, likes, comments, payments, reports

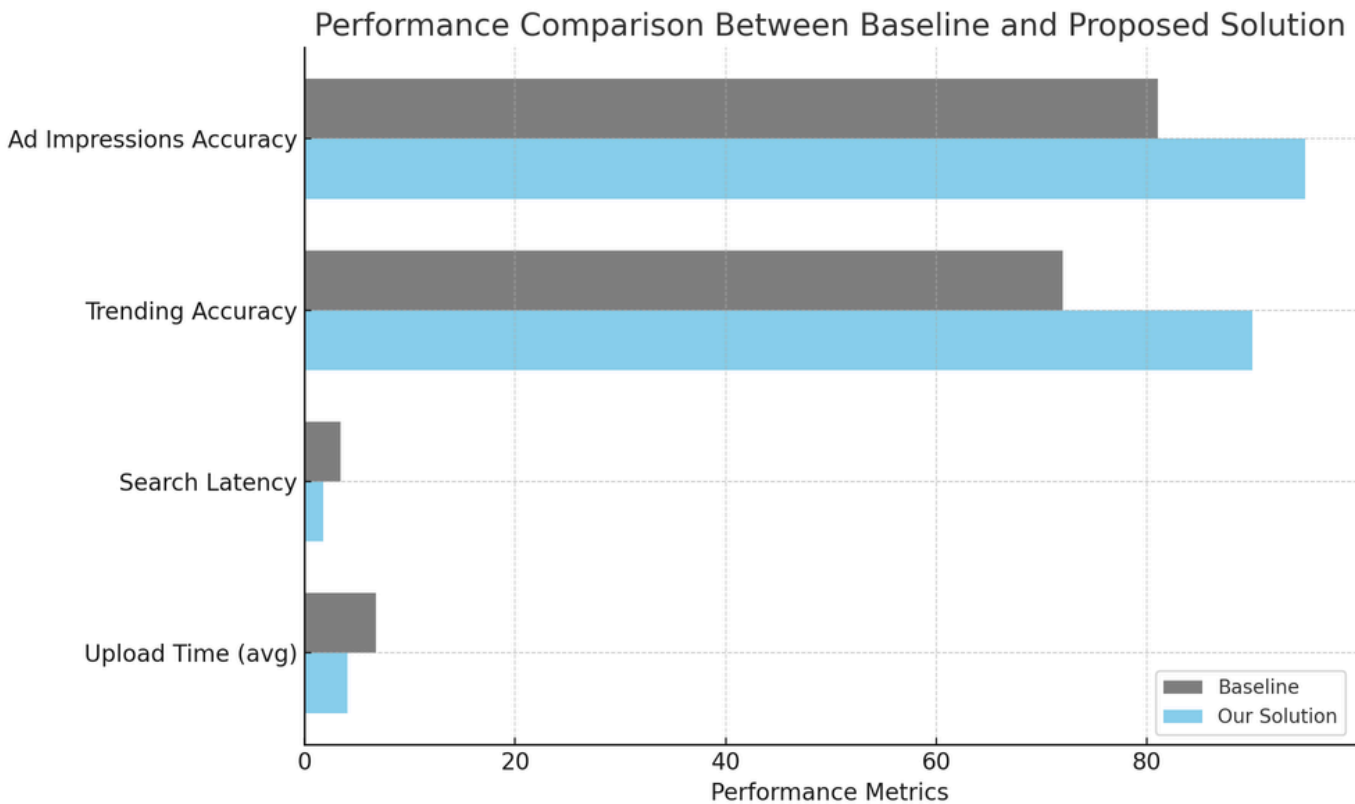
Estimations table

TEST	DESCRIPTION	VOLUME ESTIMATE
UPLOADS	VIDEOS/DAY	~1,429
INTERACTIONS	LIKES/DAY	~50,000
COMMENTS	COMMENTS/DAY	~20,000
AD CAMPAIGNS	ACTIVE/MONTH	~300

## RESULTS

The data model successfully supported:

- Real-time content delivery through **indexed video feeds**
- Scalable creator monetization through **transactions and rewards**
- Targeted advertising** based on user behavior and demographics
- Efficient moderation workflows using **AI-flagged reports**
- Limitations included high storage cost and the need for **CDN integration to handle video latency**.



## CONCLUSIONS

The project achieved its goal of designing a **scalable video-sharing platform architecture**. Our entity-relationship model enables structured interaction across **users, content, monetization, and moderation**. The research shows strong potential for deployment with **cloud-based storage, adaptive streaming, and a microservices backend**.

## BIOGRAPHY

- TikTok Business Model Analysis, 2023.
- Garcia-Molina, Ullman, Widom. Database Systems: The Complete Book.
- Google Cloud Video Intelligence API Documentation.