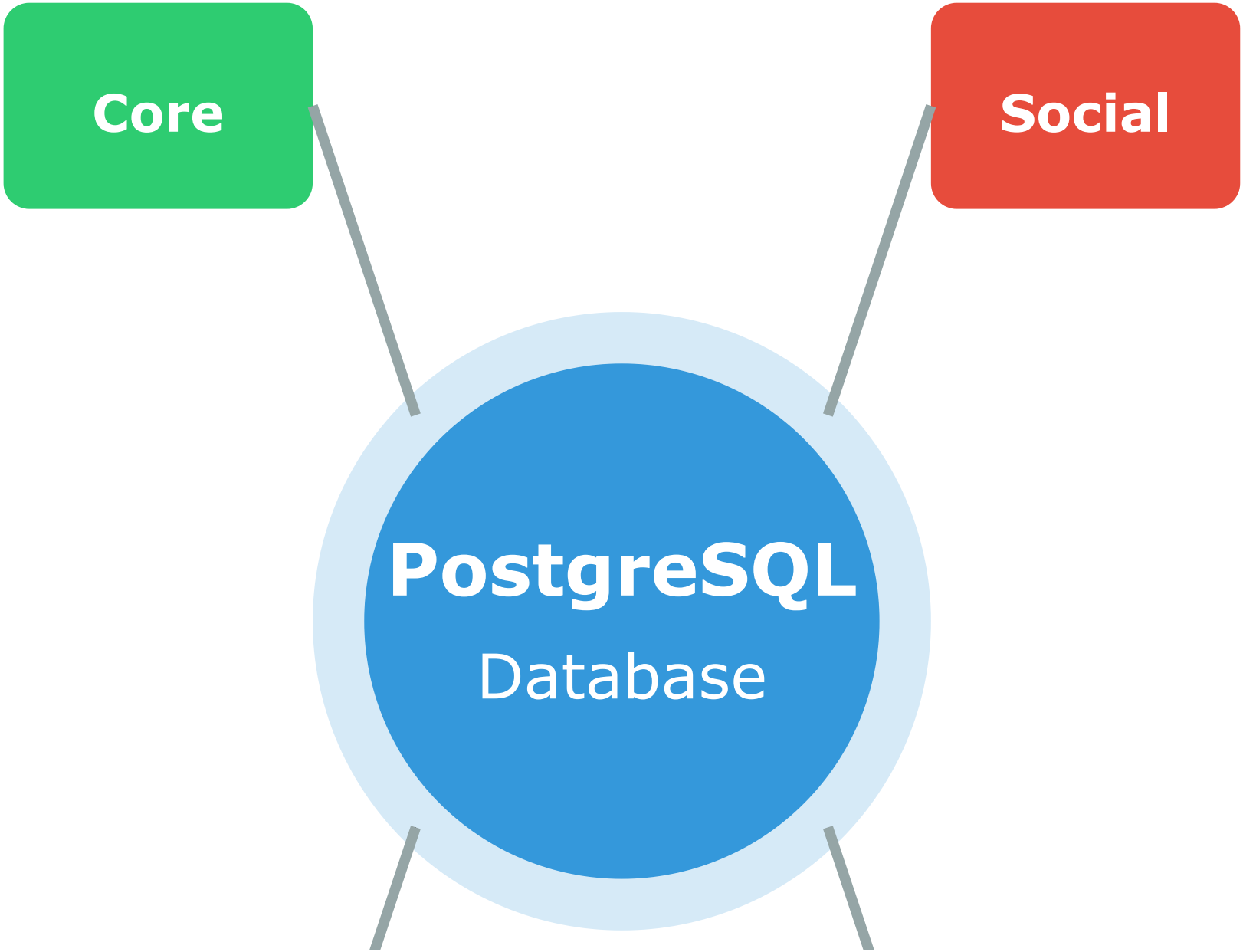
Database Schema Documentation

Entity-Relationship Diagrams


Core
Social
PostgreSQL
Database

PROJECT	DATABASE	TOTAL TABLES	GENERATED
Posting System	**PostgreSQL 15**	**25**	**October 16, 2025 at 09:10 PM**

25	32	18	85+
Tables	Functions	Triggers	Indexes

Primary Key | Foreign Key | Unique Constraint | Indexed Column

One-to-Many Many-to-Many Optional

Core System - Entity Relationship Diagram

Core System Summary

5 T ons
Key tion, nested comments (self- ons
Cor OR comment (CHECK constr

users	
id	SERIAL
username	VARCHAR(50)
email	VARCHAR(255)
password_hash	VARCHAR(255)
first_name	VARCHAR(100)
last_name	VARCHAR(100)
avatar_url	VARCHAR(500)
is_active	BOOLEAN
created_at	TIMESTAMP

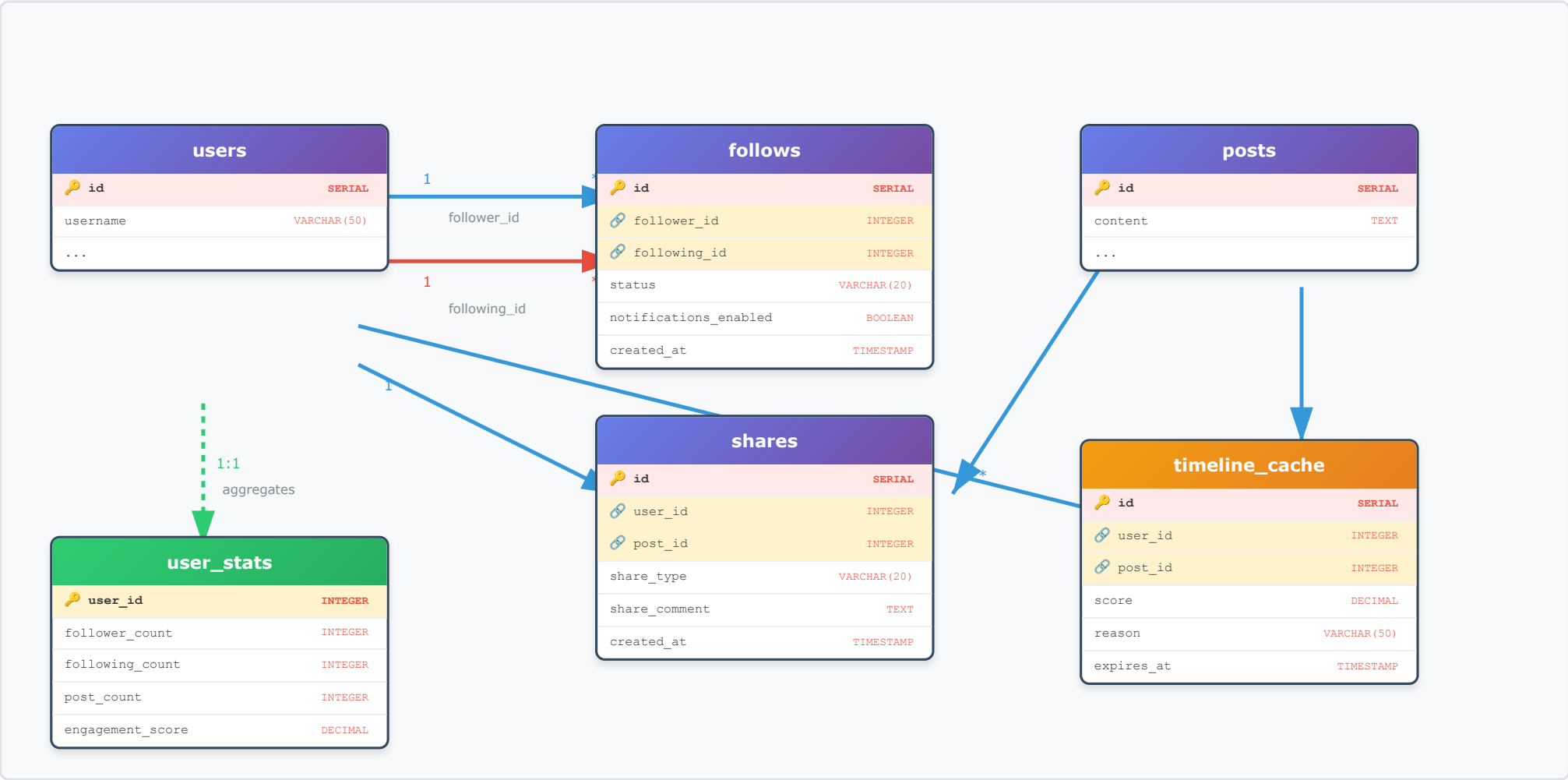
posts	
id	SERIAL
user_id	INTEGER
content	TEXT
privacy_level	VARCHAR(20)
is_published	BOOLEAN
views_count	INTEGER
created_at	TIMESTAMP

comments	
id	SERIAL
user_id	INTEGER
post_id	INTEGER
parent_id	INTEGER
content	TEXT
depth	INTEGER
created_at	TIMESTAMP

media	
id	SERIAL
user_id	INTEGER
post_id	INTEGER
comment_id	INTEGER
file_url	VARCHAR(500)
media_type	VARCHAR(20)
mime_type	VARCHAR(100)

reactions	
id	SERIAL
user_id	INTEGER
post_id	INTEGER
comment_id	INTEGER
emoji_name	VARCHAR(50)
emoji_unicode	VARCHAR(20)
created_at	TIMESTAMP

Social Features - Entity Relationship Diagram



Social Features Summary

4 Tables: follows, shares, user_stats (denormalized), timeline_cache
Key Features: Self-referencing follows (user follows user), post sharing with types (repost/quote), automated stat aggregation, timeline scoring algorithm (0-100 points)
Automation: Triggers auto-update follower/following counts and share counts

Group System - Entity Relationship Diagram

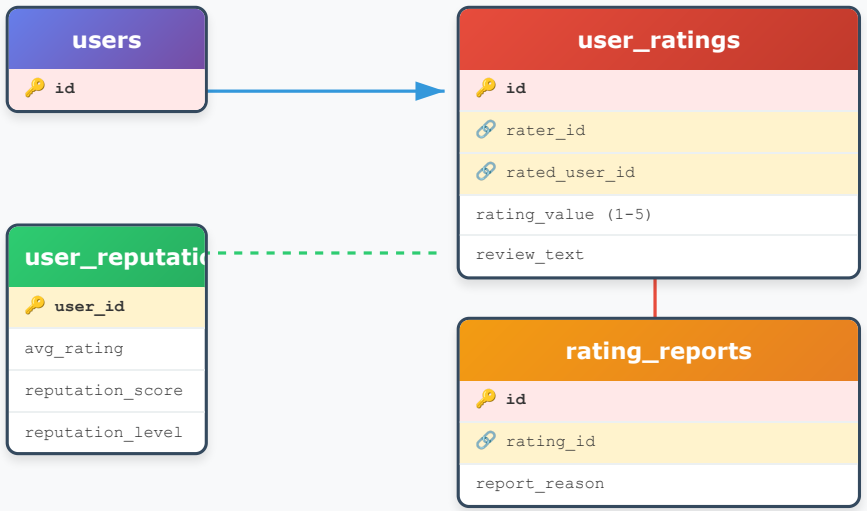
Group System Summary

9 Tables: groups, group_memberships, group_posts, group_comments (ltree), group_votes, group_post_media, group_comment_media, group_invitations, group_activity_log

Key Features: Reddit-style communities, role-based permissions (admin/moderator/member), upvote/downvote system, nested comments with ltree paths, media galleries, moderation audit logs
Automation: Triggers auto-update vote counts, member counts, and comment counts. ltree paths set automatically on insert.

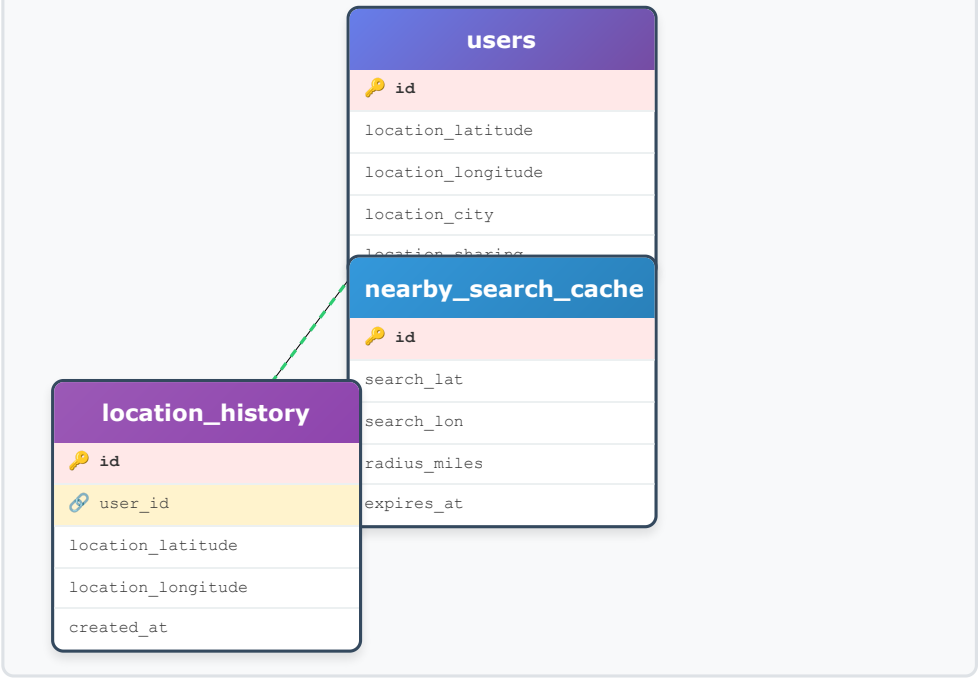
Additional Systems

Reputation System (4 Tables)



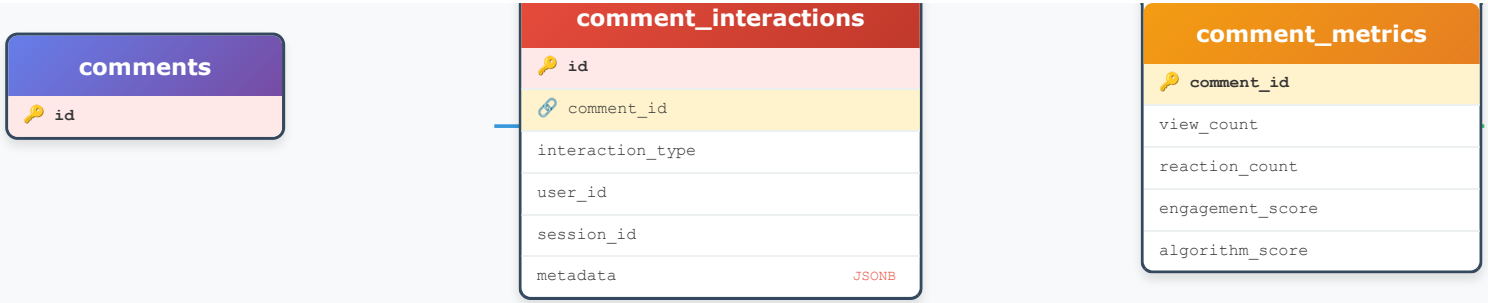
Reputation Levels:
- newcomer (0-99)
- member (100-299)
- contributor (300-499)
- veteran (500-699)
- expert (700-849)
- legend (850-1000)

Geolocation System (2 Tables + User Columns)



Features:
- Haversine distance formula (no PostGIS)
- Privacy controls: exact, city, off
- find_nearby_users() function
- 15-minute search cache
- Last 100 location history per user

Interaction Tracking (2 Tables)



Interaction Types: view, reply, reaction, share, deep_read, quote
Auto-Aggregation: Triggers update comment_metrics on each interaction

Complete Database Schema Summary

5	4	9	7
Core Tables	Social Tables	Group Tables	Other Systems

All Tables by Subsystem

Core System (5)

- **users** - User accounts & authentication
- **posts** - User-generated content
- **comments** - Nested comments (parent_id)
- **media** - File attachments
- **reactions** - Emoji reactions

Social Features (4)

- **follows** - User follow relationships
- **shares** - Post sharing/reposts
- **user_stats** - Denormalized metrics
- **timeline_cache** - Scored feeds (0-100)

Group System (9)

- **groups** - Community groups
- **group_memberships** - Member roles
- **group_posts** - Posts within groups
- **group_comments** - ltree nested comments
- **group_votes** - Upvote/downvote
- **group_post_media** - Post attachments
- **group_comment_media** - Comment attachments
- **group_invitations** - Invite system
- **group_activity_log** - Audit trail

Other Systems (7)

- **user_ratings** - 1-5 star ratings
- **user_reputation** - 0-1000 score
- **rating_reports** - Dispute system
- **helpful_marks** - Helpful content
- **comment_interactions** - Tracking events
- **comment_metrics** - Aggregated stats
- **location_history** - GPS tracking
- **nearby_search_cache** - Geo cache

Key Database Features

Automatic Denormalization

Triggers automatically maintain counts and scores: follower_count, following_count, member_count, upvotes, downvotes, score

Nested Comments

Two approaches: parent_id (traditional) and ltree paths (PostgreSQL extension) for efficient tree queries

Scoring Algorithms

Geolocation

Timeline (0-100): relationship + recency + engagement Reputation (0-1000): ratings + quality + activity - reports

Haversine distance formula (no PostGIS required). Privacy controls: exact, city, off. Efficient bounding box filtering

Database Extensions & Functions

Extension	Purpose	Usage
uuid-ossp	UUID generation	Generating unique tokens and identifiers
ltree	Hierarchical data	Efficient nested comment queries in groups

Key Stored Functions (32 total)

- **update_updated_at_column()** - Universal timestamp updater
- **calculate_distance_miles()** - Haversine formula
- **calculate_reputation_score()** - 0-1000 scoring
- **set_group_comment_path()** - ltree path management
- **update_follow_counts()** - Auto-update follower stats
- **find_nearby_users()** - Geolocation search
- **update_group_post_votes()** - Vote counting
- **is_group_admin()** - Permission helper

Triggers (18 total)

- update_users_updated_at
- trigger_update_share_counts
- trigger_update_group_comment_votes
- comment_interaction_metrics_trigger
- update_posts_updated_at
- trigger_update_group_member_count
- trigger_set_group_comment_path
- trigger_limit_location_history
- trigger_update_follow_counts
- trigger_update_group_post_votes
- trigger_update_user_reputation
- + 7 more timestamp triggers

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