

Global Real-Time Translator Chat - Design Doc

Project Overview

A chat platform where any two (or more) participants type in their native language and receive auto-translated messages in real time—across web and mobile.

Functional Requirements

User Management; Chat Rooms; Real-Time Messaging; Translation Service; Message History & Persistence; Presence & Typing Indicators; Notifications; Admin / Moderation.

Non-Functional Requirements

Latency: <200 ms; Scalability: 10k+ concurrent; Reliability: 99.9% uptime; Security: TLS, JWT auth; Observability: message volume metrics, API latency, translation errors.

High-Level Architecture

Clients (Web/Mobile) → WebSocket/gRPC-web → API Gateway/Auth → Chat Service & Translation Service → PostgreSQL & Redis.

Data Model

User (id, name, email, default_lang); Room (id, name, is_private); RoomMember; Message (id, room_id, sender_id, text_original, lang_original); Translation (message_id, target_lang, text_translated).