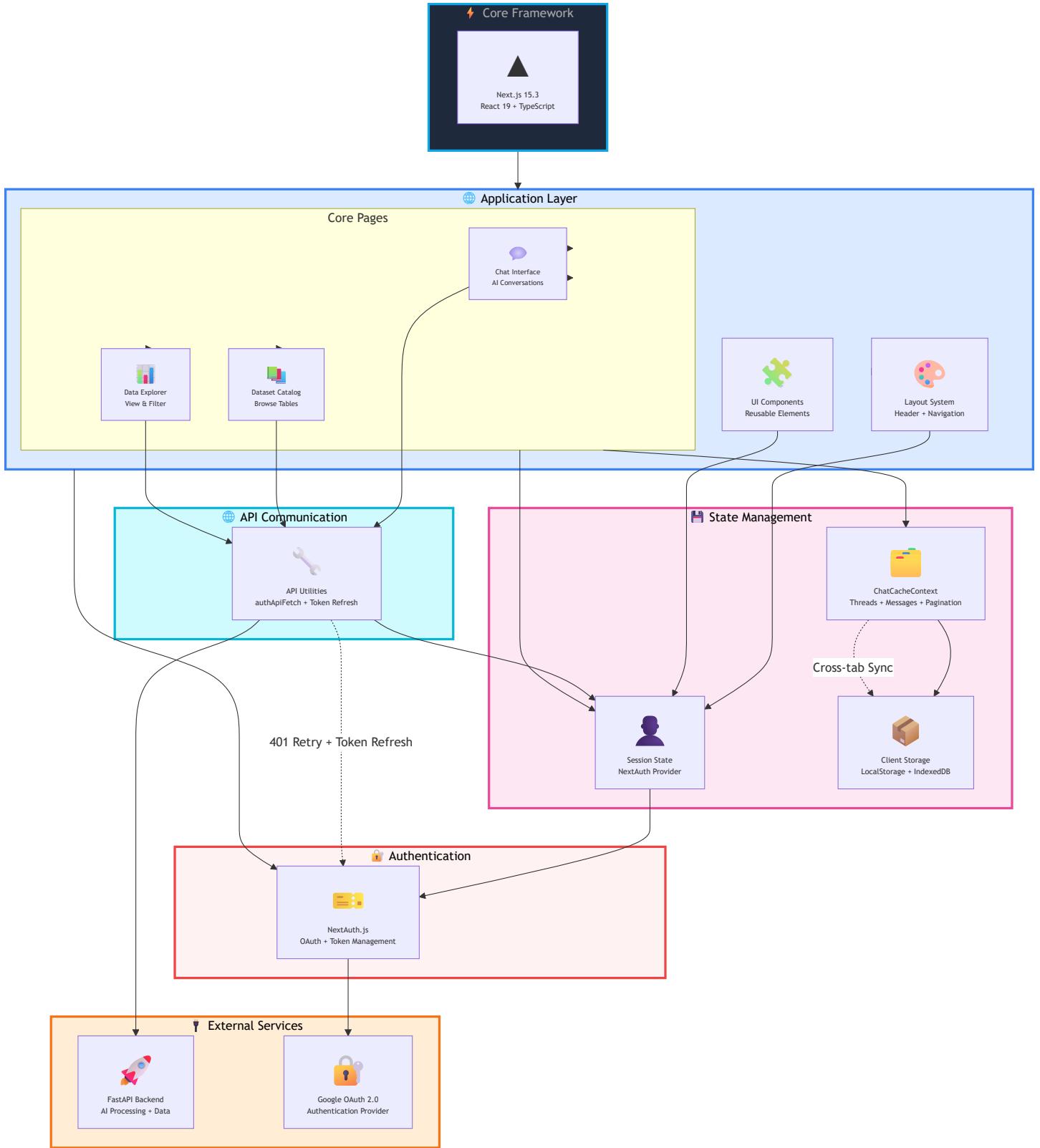


Frontend Architecture Diagram - Version 2 (Simplified)



Simplified Architecture Overview

Core Layers (6 Total)

1.  **Core Framework:** Next.js 15 with React 19 and TypeScript
2.  **Application Layer:** Pages, Layout, and UI Components
3.  **State Management:** Chat cache, Session, and Client storage
4.  **Authentication:** NextAuth with Google OAuth
5.  **API Communication:** Centralized API utilities with token refresh
6.  **External Services:** Backend and Google OAuth provider

Key Data Flows

1. User Interaction Flow

User → Page Component → State Management → API Utils → Backend

2. Authentication Flow

User → NextAuth → Google OAuth → Session State → Protected Pages

3. Chat Flow

Chat Page → ChatCacheContext → API Utils → Backend → Cache Update → UI Render

Key Architectural Decisions

1. **Centralized State:** ChatCacheContext manages all chat-related data with persistence
2. **Token Management:** Automatic token refresh on 401 responses
3. **Client-Side Caching:** LocalStorage for fast access, IndexedDB for large data
4. **Protected Routes:** NextAuth guards all sensitive pages
5. **Pagination:** Incremental loading for better performance

Technology Stack

Layer	Technology
Framework	Next.js 15, React 19, TypeScript
Auth	NextAuth, Google OAuth 2.0
State	React Context API, LocalStorage
Styling	Tailwind CSS 4
API	Fetch with custom wrapper

Deployment

Vercel Edge Network

↓

Next.js Frontend

↓

FastAPI Backend (Railway)

Version 2 Changes: Simplified from 10 layers to 6 core layers, removed implementation details, focused on essential architecture and data flow patterns.