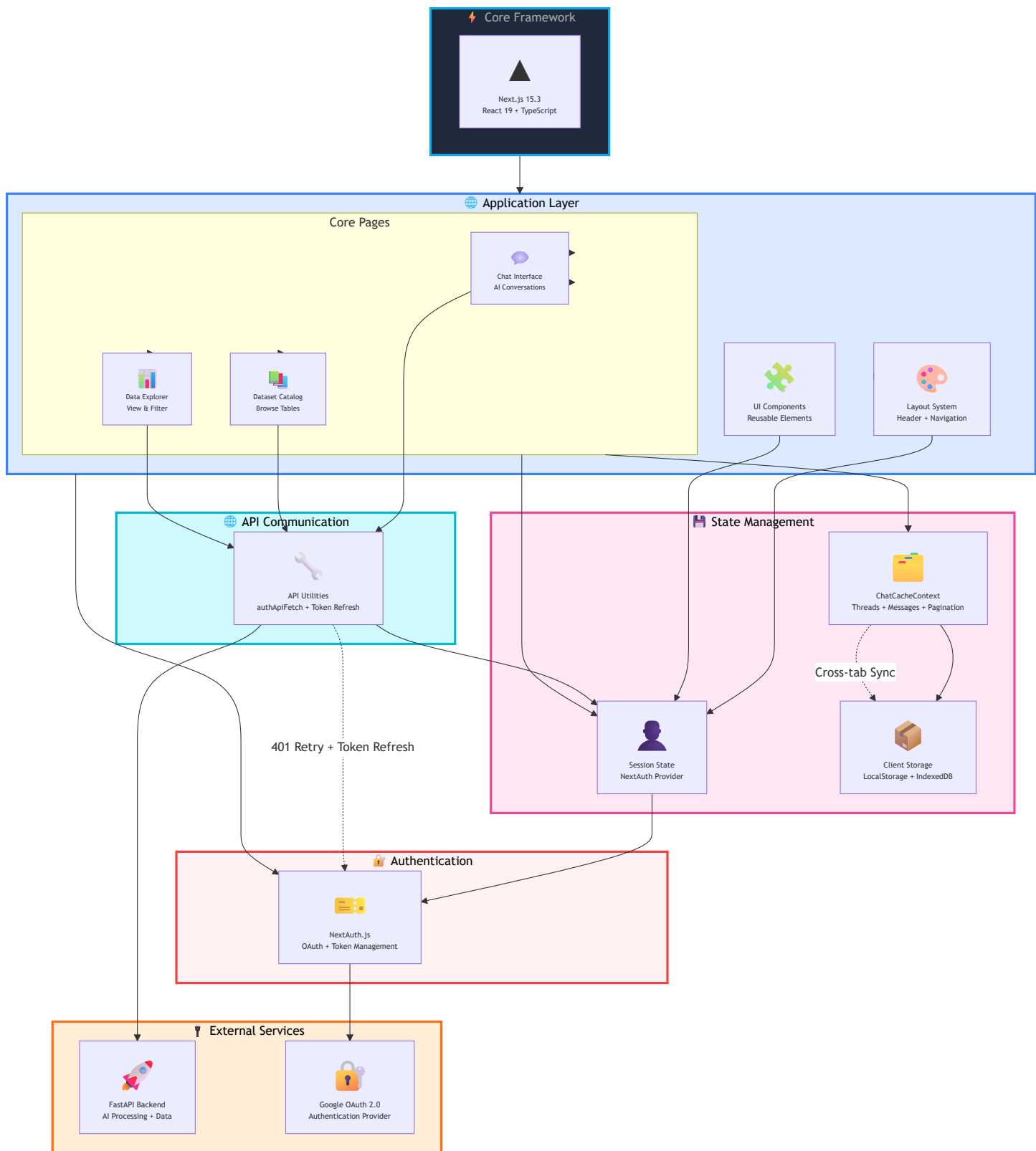


# Frontend Architecture Diagram - Version 2 (Simplified)



# 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.