WebAudio Studio: Complete Development Guide

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Project Overview

WebAudio Studio is a browser-based audio editing application with these key features:

- Basic audio editing: trim, cut, split with crossfade capability
- Vocal extraction from music tracks
- 8-band equalizer with visual representation
- No account required, session-based usage

Tech Stack

- **Frontend**: Next.js 14 (App Router) with React 18
- **Backend**: Python FastAPI for audio processing
- **Audio Processing**: Web Audio API, FFmpeg, Spleeter
- **Visualization**: Wavesurfer.js
- **Deployment**: Vercel (frontend) & Vercel Serverless Functions (backend)

Environment Setup

Prerequisites

- Node.js (v18+)
- Python (v3.9+)
- Git

```
src/
├── app/
│   ├── page.tsx          # Main page
│   ├── layout.tsx        # App layout
│   └── globals.css       # Global styles
├── components/
│   ├── AudioPlayer.tsx    # Audio playback component
│   ├── WaveformEditor.tsx # Waveform visualization
│   ├── ControlPanel.tsx   # Edit controls
│   ├── Equalizer.tsx      # 8-band equalizer
│   └── VocalExtractor.tsx # Vocal separation UI
└── lib/
    ├── audioProcessing.ts # Client-side audio processing
    └── api.ts             # API client for backend calls
```