Software Requirements Specification (SRS)

SoundScript – Client-Side Music Streaming Platform

Prepared by: Dipsana Roy

Version: v1.0.1

1. Introduction

1.1 Purpose

This document defines the functional and non-functional requirements for **SoundScript**, a client-side music streaming web application that delivers a modern music player experience using a modular, CDN-based static media architecture.
The goal is to specify behavior, performance expectations, and architectural design constraints for future maintenance, scalability, and academic/professional review.

1.2 Scope

SoundScript provides:

- Local & CDN-based audio streaming
- Playlist-like album organization
- Responsive UI across devices (mobile, tablet, desktop, TV)
- Real-time play state preservation
- Dynamic library navigation
- Modular, event-driven audio control architecture
- **New in v1.0.1:** Touch-optimized gestures, drag precision, loader reliability, and UI polish

The platform is designed as a **logic plane** separated from its **media plane** using a dedicated CDN repository.

1.3 Definitions

Term	Description
CDN	External static media repository (soundscript-cdn)
Queue	Ordered track list currently loaded
Media Plane	CDN asset layer (audio, images, metadata)
Logic Plane	SoundScript app layer (HTML, CSS, JS)
Mini Bar	Draggable compact playback control UI

Seek Bar	Audio timeline controller with gradient sync
Event Emitter	Custom publish-subscribe system for player events

2. Overall Description

2.1 Product Perspective

SoundScript is a **pure frontend streaming client** backed by a static CDN for content delivery.
It contains **no backend dependency** and is fully portable between hosting environments (GitHub Pages, localhost, any static host).

2.2 Product Functions

- Stream audio tracks from CDN
- Maintain queue & playback state
- Search active library (partial-title matching)
- Manage responsive UI with touch/desktop gestures
- Track plays using heuristic logic ($\geq$2 min or $\geq$80% listened)
- Animate and adapt UI dynamically (gradient shifts, transitions)
- **New in v1.0.1:** Precise 2D mini-bar drag, swipe-direction correction, instant section loading

2.3 User Classes

User	Description
Listener	General user streaming audio
Developer	Maintainer or contributor reviewing architecture

2.4 Operating Environment

Component	Description
Browser	Modern Chromium / Gecko (Chrome, Firefox, Edge)
Hosting	Localhost, GitHub Pages, any static host
CDN	GitHub Raw (raw.githubusercontent.com)

3. System Features

3.1 Dynamic Album Loader

- Auto-detect albums from folder-based CDN structure
- Load metadata from info.js
- Generate cards dynamically using modular card-generator
- Bind event emitters to each track

3.2 Music Player Engine

- Queue management with O(1) access post-initialization
- State preservation (play/pause, volume, likes, play counts)
- Next/Prev/Seek/Replay controls
- Event-driven playback (custom event-emitter system)
- **Enhanced in v1.0.1:** Seek-bar sync fix, drag-coordinate precision

3.3 Seek Bar System

- Real-time sync with audio playback
- Gradient color binding to background engine
- Scrub seek support (desktop & mobile)
- Visual feedback on hover/tap

3.4 Responsive UI System

- Multi-breakpoint design (mobile-first)
- Hamburger navigation (CSS-only toggle in v1.0.1)
- Mini bar with 2D draggable physics
- Touch-enabled card sliders with corrected swipe logic
- **New in v1.0.1:** touch-action: none for custom drag control

3.5 Local Stats Engine

- Play counter logic (heuristic: ≥ 2 min or $\geq 80\%$)
- Like / dislike tracking (opinion + display)
- Local persistence via localStorage with validation
- No external transmission of user data

3.6 Loading & Navigation System

- Manual show/hide loader (replaced DOMContentLoaded dependency)
- Instant section switching via hideSect/showSect
- Pre-emptive UI hiding to prevent flash artifacts
- **Refactored in v1.0.1:** Removed fragile auto-loader, added manual control in gen-util

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4. Non-Functional Requirements

Category	Requirement
Performance	UI transitions must stay <16ms (60 FPS)
Portability	CDN path must be swappable via CDN_BASE export
Reliability	Player must preserve state across navigation and refresh
Maintainability	Modular JS design with private scoped modules
Scalability	CDN content expansion supported without app redeployment
Usability	Mobile-first interaction support (touch, swipe, drag)

Security	No personal data collection; all stats local only
Accessibility	Semantic HTML, keyboard navigation support (partial)

5. Design Constraints

- No backend dependency
- Static hosting only
- CDN must remain path-stable
- No frameworks (Vanilla JS only)
- Modular architecture with low coupling
- All media served via external CDN
- MIT License compliance

6. Future Scope

- Playlist creator (custom lists)
- Full search engine (artist, album, title)
- Shuffle / smart queues
- Backend auth integration (optional)
- Multilingual UI (English, Hindi, Bengali)
- Cloudflare CDN mirror for faster global delivery

7. Version History

Version	Date	Highlights
v1.0.1	2026-01-05	Mobile drag fixes, swipe logic, loader refactor, UI polish, bug squashing
v1.0.0	2026-01-04	Initial stable production release with full CDN architecture

8. Conclusion

SoundScript is a **portable, modular, CDN-driven music streaming platform** designed for real-world architectural correctness, performance stability, and long-term scalability.
Version **1.0.1** strengthens touch interaction, fixes edge-case bugs, and refactors loading logic for greater reliability — ready for production deployment and further iteration.