Project Report

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Project Report: Musicify

Phase :1 Project Ideation Phase

1 Introduction

1.1 Project Overview

MusicifyMusicify is a comprehensive music streaming platform built using the MERN (MongoDB, Express.js, React, Node.js) stack. The platform creates a seamless experience for music enthusiasts to discover, explore, and listen to music from various genres and artists.

The application features a multi-role system with distinct user types:

- **Regular Users (Listeners)**: Can browse the music catalog, create accounts, create playlists, follow artists, and listen to music with both free and premium tiers
- **Artist Users**: Have access to a specialized dashboard for uploading and managing their music, tracking listener statistics, and interacting with fans
- **Admin Users**: Maintain the platform, manage users, and monitor content

The project integrates Firebase for authentication and MongoDB Atlas for database management, creating a robust and scalable infrastructure. The responsive design ensures a consistent experience across desktop and mobile devices, allowing users to enjoy music anytime and anywhere. The application includes features like continuous playback, personalized playlists, and algorithmic recommendations.

1.2 Purpose

The primary purpose of Musicify is to create an accessible and user-friendly platform connecting music lovers with their favorite tracks while providing artists with efficient management tools and listener insights.

The key objectives of the Musicify project are:

- **Enhanced Music Discovery** – Provide algorithmic recommendations, curated playlists, and radio functionality to help users discover music matching their interests
- **Seamless Listening Experience** – Enable efficient browsing, searching, playlist creation, and a streamlined playback process with queue management
- **User Account Management** – Allow listeners to create profiles with both free and premium tiers, track listening history, save favorite songs, and manage personal information securely
- **Artist Management System** – Equip artists with tools to easily upload, update, and organize their music catalog, as well as monitor listener statistics
- **Security & Authentication** – Implement Firebase authentication alongside secure data handling practices to protect user information and prevent unauthorized access
- **Responsive & Intuitive UI** – Create a visually appealing, easy-to-navigate interface with dark mode that works seamlessly across all devices
- **Database Optimization** – Utilize MongoDB Atlas for efficient data storage and retrieval, ensuring fast performance even with large music catalogs and user bases
- **Streaming Architecture** – Develop robust backend systems to handle audio streaming, playlists, and user activity tracking
- **Scalable Architecture** – Build a well-structured application using the MERN stack that can easily accommodate growing catalogs, increasing user traffic, and additional features

2 Ideation :

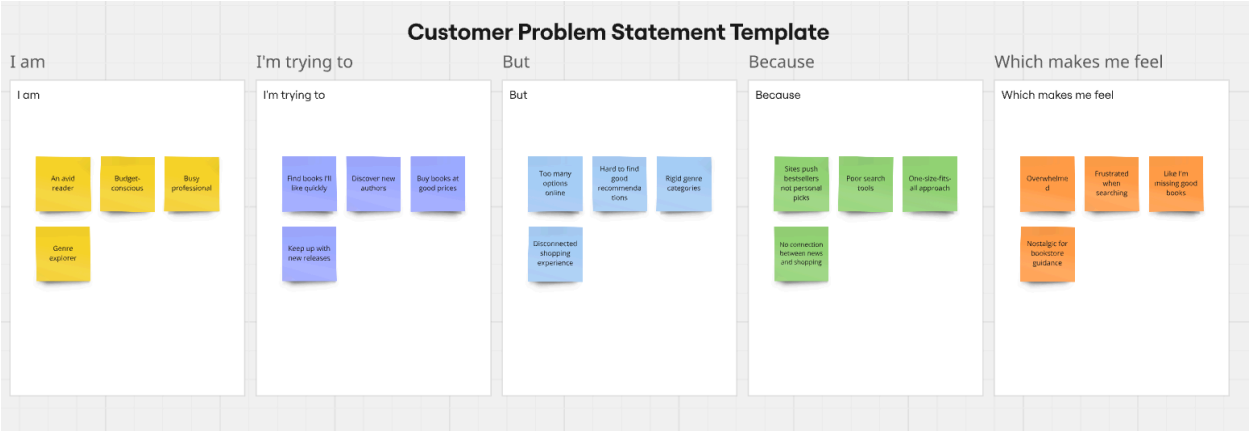
Date	**27 March 2025**
Team ID	**SWTID1744391109**
Project Title:	**Musicify**
Maximum Marks	**2 Marks**

2.1 Customer Problem Statement Template:

Create a problem statement to understand our customers' point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

Example:



Problem Statement (PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
PS-1	A music enthusiast	Discover new artists and songs	Most platforms have limited discovery options	Algorithms tend to repeat similar recommendations	Stuck in a music bubble
PS-2	Budget-conscious listener	Listen to high-quality music	Many platforms require premium subscriptions	Free tiers have intrusive ads and limitations	Frustrated with interruptions

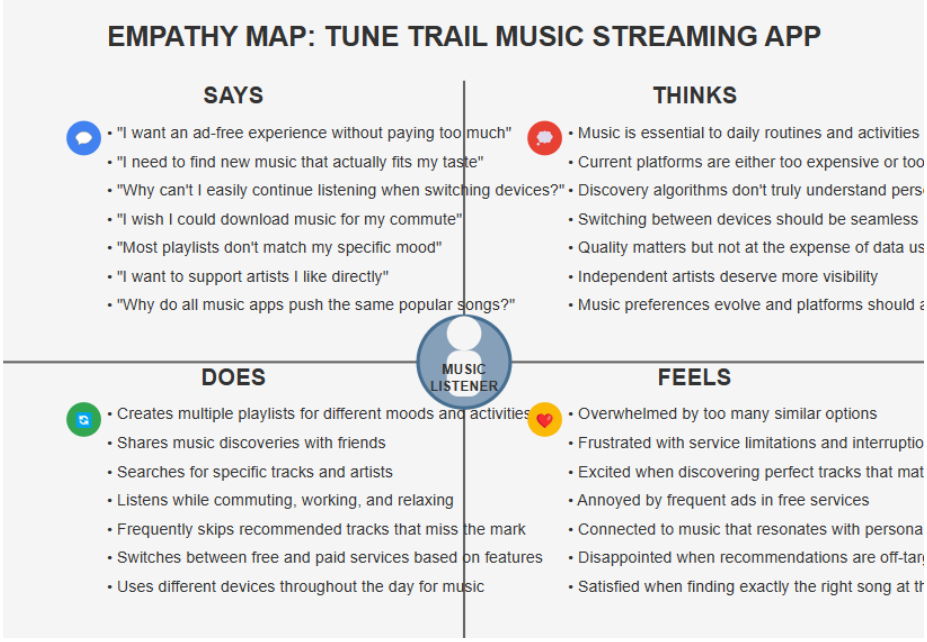
PS-3	Independent artist	Share my music with potential fans	Getting visibility is extremely difficult	Major labels dominate promotional slots	Overlooked and undervalued
PS- 4	On-the-go listener	Seamlessly transition between devices	My listening state doesn't sync well	Platform limitations in cross-device experience	Disconnected and annoyed

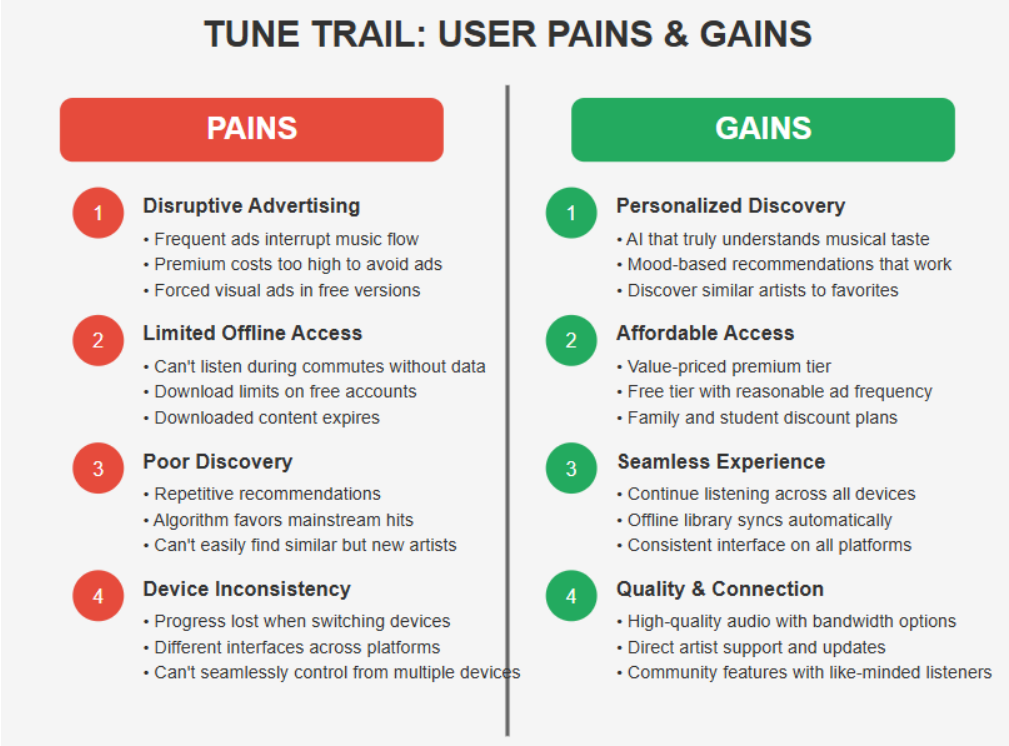
2.2 Empathy Map Canvas:

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

It is a useful tool to helps teams better understand their users.
Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Example: Our Project on Full stack Music Streaming Platform- Musicify

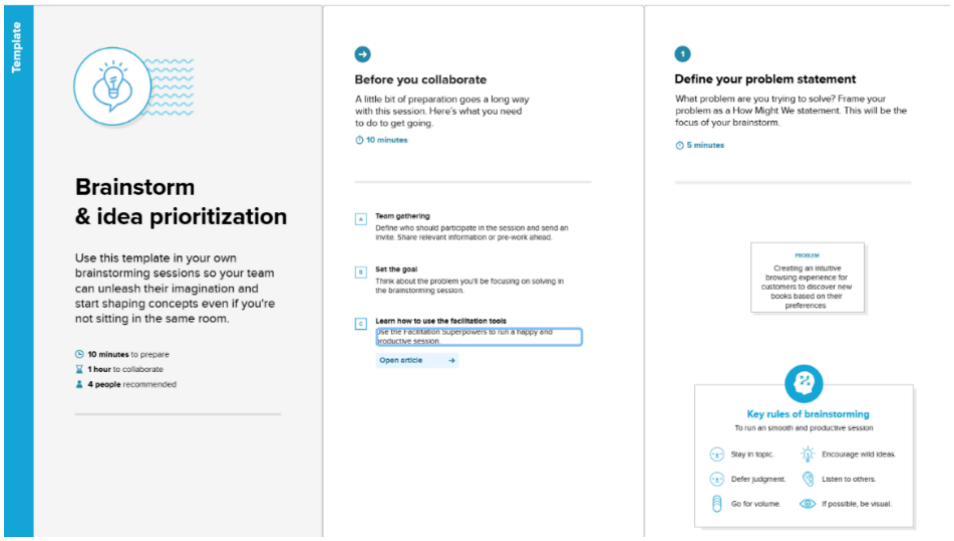




2.3 Brainstorm & Idea Prioritization :

Step-1: Team Gathering, Collaboration and Select the Problem Statement

- Team identified the core problem: "Music streaming platforms fail to balance affordability, discovery, and seamless experience"
- Focus on creating a service that addresses these three key pain points simultaneously

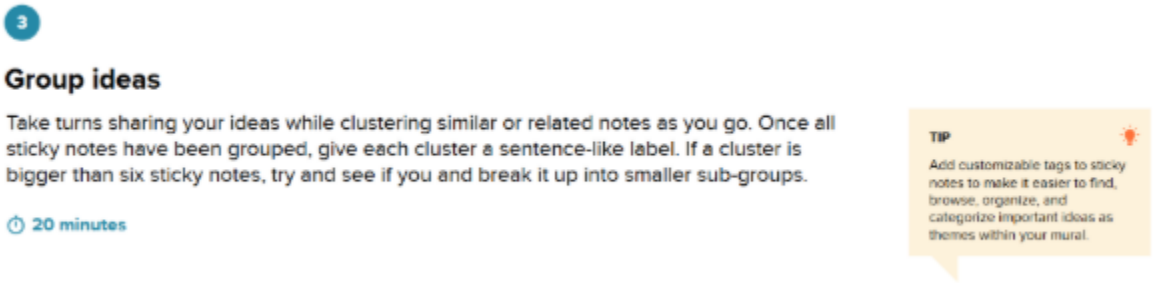


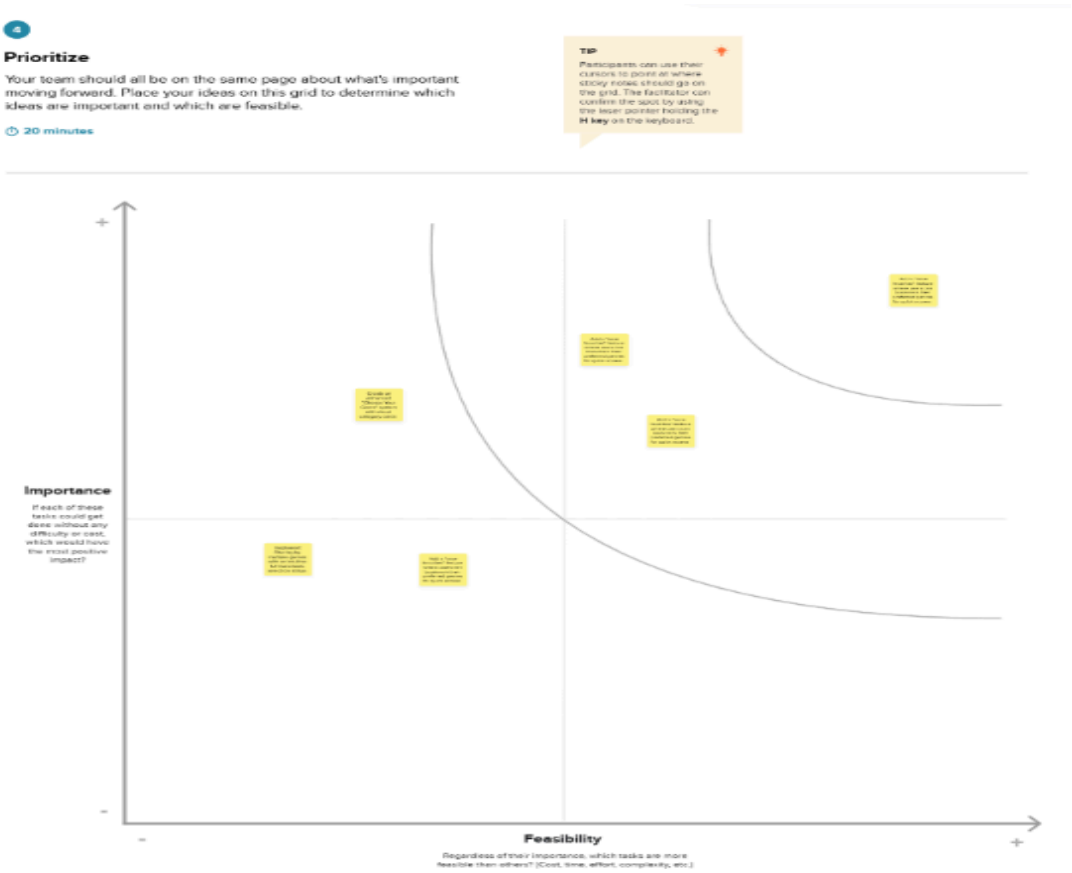
Step-2: Brainstorm, Idea Listing and Grouping

- **Affordability Ideas**: Tiered pricing, ad-supported free tier with reasonable limits, student/family plans
- **Discovery Ideas**: Advanced algorithm using listening habits, mood detection, playlist radio, genre exploration
- **Experience Ideas**: Cross-device syncing, offline mode, background play, queue management, high-quality audio options
- **Differentiation Ideas**: Lyric integration, song information, artist insights, visualization features

Step-3: Idea Prioritization

- **High Impact/Low Effort**: Cross-device listening state sync, basic recommendation engine, playlist management
- **High Impact/High Effort**: Advanced discovery algorithm, offline mode, premium tier infrastructure
- **Low Impact/Low Effort**: Basic user profiles, dark/light themes, sharing capabilities
- **Low Impact/High Effort**: Visualization features, social network integration, lyrics synchronization

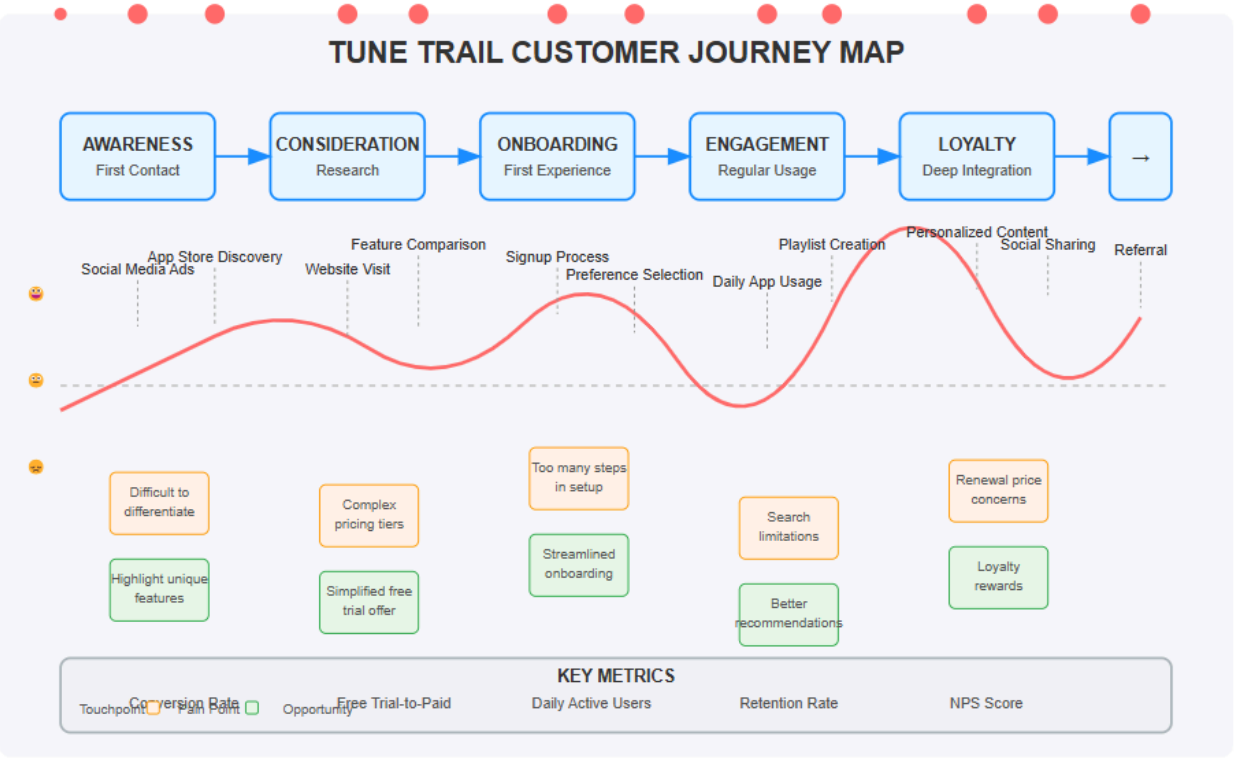




3 REQUIREMENT ANALYSIS

Date	**30 March 2025**
Team ID	**SWTID1744391109**
Project Title	**Musicify**
Maximum Marks	**4 Marks**

3.1 Customer Journey Map:



3.2 Solution Requirements (Functional & Non-functional)

Functional Requirements:

The following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration & Authentication	Registration through Form, Social Login Integration, Role selection (Listener, Artist, Admin), Free/Premium tier selection
FR-2	Music Playback & Control	Play/Pause/Skip Controls, Volume Control, Queue Management, Continuous Playback, Background Playing
FR-3	Role-Based Dashboard Access	Admin: Content Moderation & Statistics, Artist: Upload & Analytics, Listener: Personalized Home & Library
FR-4	Music Discovery	Search functionality, Browse categories, New releases section, Algorithmic recommendations
FR-5	Playlist & Library Management	Create/Edit/Delete Playlists, Add/Remove Tracks, Like Songs, Follow Artists
FR-6	Personalized Experience	Weekly Discovery Playlist, Recently Played, Favorite Artists Updates, For You Section

Non-functional Requirements:

The following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Intuitive UI with dark theme, mobile responsiveness, and accessibility features
NFR-2	**Security**	Firebase Auth, token-based API security, secure payment processing
NFR-3	**Reliability**	99.9% uptime guarantee with failover systems and data backups

NFR-4	**Performance**	Fast stream initialization (<2s), minimal buffering, efficient API responses
NFR-5	**Availability**	Cloud-hosted infrastructure with load balancing and g distribution
NFR-6	**Scalability**	Microservice architecture capable of handling millions of concurrent streams

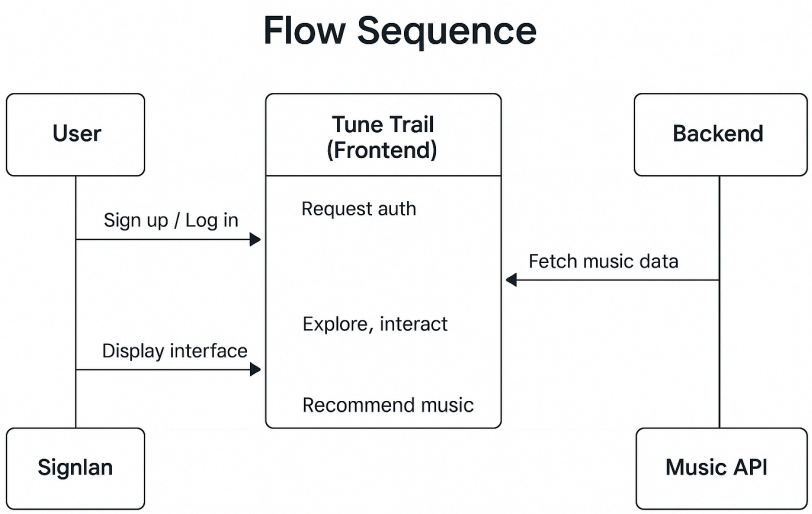
3.3 Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Example: (Simplified)

Flow Sequence:

Example: DFD Level 0 (Industry Standard)



User Stories:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Listener	Registration	USN-1	As a listener, I can create an account and select my music preferences	I can successfully register and see personalized content	High	Sprint-1
Listener	Music Playback	USN-2	As a listener, I can play music with standard controls	I can play/pause/skip tracks and adjust volume	High	Sprint-1

Listener	Playlist Management	USN-3	As a listener, I can create and manage playlists	I can create, edit, and delete playlists	High	Sprint-1
Listener	Discovery	USN-4	As a listener, I can browse music by genres, moods, and activities	I can navigate categories and find relevant music	Medium	Sprint-2
Listener	Premium Features	USN-5	As a premium listener, I can download music for offline listening	I can access downloaded music without internet connection	Medium	Sprint-2
Listener	Cross-device	USN-6	As a listener, I can continue playback across multiple devices	My playback state syncs when I switch devices	High	Sprint-2
Artist	Registration	USN-7	As an artist, I can create an artist account	I can access artist-specific features after verification	High	Sprint-1
Artist	Music Upload	USN-8	As an artist, I can upload and manage my music	I can add, edit, and remove my tracks from the platform	High	Sprint-1
Artist	Analytics	USN-9	As an artist, I can view listener statistics for my music	I can see play counts, geographic data, and listener demographics	Medium	Sprint-2
Admin	User Management	USN-10	As an admin, I can manage user accounts	I can view, edit, and deactivate user accounts when necessary	High	Sprint-1

Admin	Content Moderation	USN-11	As an admin, I can review and moderate uploaded content	I can approve, reject, or flag content for review	Mediu m	Sprint-2
Admin	Platform Monitoring	USN-12	As an admin, I can view system performance metrics	I can access dashboards showing usage statistics and performance data	Low	Sprint-3

3.4 Technical Architecture:

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web-based responsive interface with dark theme	React.js, Tailwind CSS
2.	Authentication Service	Handles user registration, login, and session management	Firebase Authentication, JWT
3.	Streaming Service	Manages audio delivery and playback	Node.js, Express.js, Web Audio API
4.	Discovery Service	Handles recommendations and browsing functionality	Node.js, Express.js, Machine Learning algorithms
5.	User Management Service	Manages user profiles, preferences, and subscription status	Node.js, Express.js
6.	Database	Stores user profiles, music metadata, playlists, listening history	MongoDB (NoSQL)
7.	File Storage	Stores music files and related media	AWS S3 / Firebase Storage
8.	Cloud Database	Cloud-hosted database instance	MongoDB Atlas
9.	Payment Processing	Handles premium subscription transactions	Stripe / PayPal integration
10.	Infrastructure (Server/Cloud)	Cloud-hosted platform with load balancing	AWS / Google Cloud / Azure

Table 2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Modern web technologies for scalable application development	MERN Stack, Web Audio API
2.	Security Implementations	Multi-layer security approach	HTTPS, OAuth 2.0, JWT, Content Encryption
3.	Scalable Architecture	Microservice design for independent scaling of components	Docker, Kubernetes, Load Balancing
4.	Availability	Redundant systems with automatic failover	Multi-region deployment, Health monitoring
5.	Performance	Efficient streaming and caching strategies	CDN integration, Progressive loading, Audio compression