St. Francis Institute of Technology
Department of Computer Engineering

Blockchain-based DRM Management System

Guided by- Ms. Annies Minu

Group Members

Name	Roll No.
Vendrell Mendonca	30
Ashwin Pillai	37
Elbin Thomas Abraham	45
Kyle Crasto	63

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Introduction

- The music industry is confronted with a significant challenge: the need to strike a delicate balance between compensating artists adequately and ensuring accessibility for consumers. Conventional Digital Rights Management (DRM) systems often impose restrictions on user control, impeding fair revenue distribution.
- Our solution harnesses blockchain technology, a secure and transparent distributed ledger, to tackle the shortcomings of existing DRM solutions.
  - Decentralized Control: By eliminating the necessity for a central authority, artists and publishers retain greater autonomy over their content and pricing.
  - Transparent Transactions: All transactions, including purchases, royalties, and ownership records, are immutably recorded on the blockchain, ensuring accountability and traceability.

Introduction

- Fair Revenue Distribution: Smart contracts automate royalty payments according to predefined rules, ensuring that artists receive their rightful share for each song play or purchase.

- This initiative presents a more equitable and secure music distribution ecosystem. Artists stand to benefit from transparent royalty payments and enhanced control over their content. Consumers gain access to a broader array of music with flexible licensing options. Ultimately, the music industry flourishes on a secure and efficient platform that fosters creativity and innovation.

Literature Review

Ref	Year	Research Paper Name	Point of Reference	Analysis
1	2020	Innovating in the Music Industry: Blockchain, Streaming and Revenue Capture	Evolution of Music Industry Business Model.[1]	The paper acknowledges the impact of streaming platforms on music consumption patterns, setting the stage for the need to address the outdated royalty distribution system.[1]
			Challenges in Royalty Distribution.[1]	It highlights the disparity in financial benefits, where musicians receive a smaller share compared to middlemen such as platforms, labels, and publishers.[1]
			Results and Challenges.[1]	It indicates that while blockchain technology has the potential to revolutionize royalty distribution, there is a lack of knowledge and interest in its implementation among industry professionals.[1]

Literature Review

Ref	Year	Research Paper Name	Point of Reference	Analysis
2	2021	Securing music sharing platforms: A Blockchain-Based Approach.	Digital Era Impact on Music Storage.[2]	This paper highlights the shift to digital music storage and the challenges faced by artists due to unauthorized downloading and sharing of their works..[2]
			Blockchain and IPFS Integration for Copyright Protection.[2]	It demonstrates how blockchain and IPFS together ensure copyright protection, file retrieval, and revenue validation..[2]
			Consensus Mechanism and Proof of Stake (PoS).[2]	It discusses the importance of consensus in blockchain networks, particularly PoS in Ethereum, to validate transactions and maintain the integrity of the blockchain..[2]

Literature Review

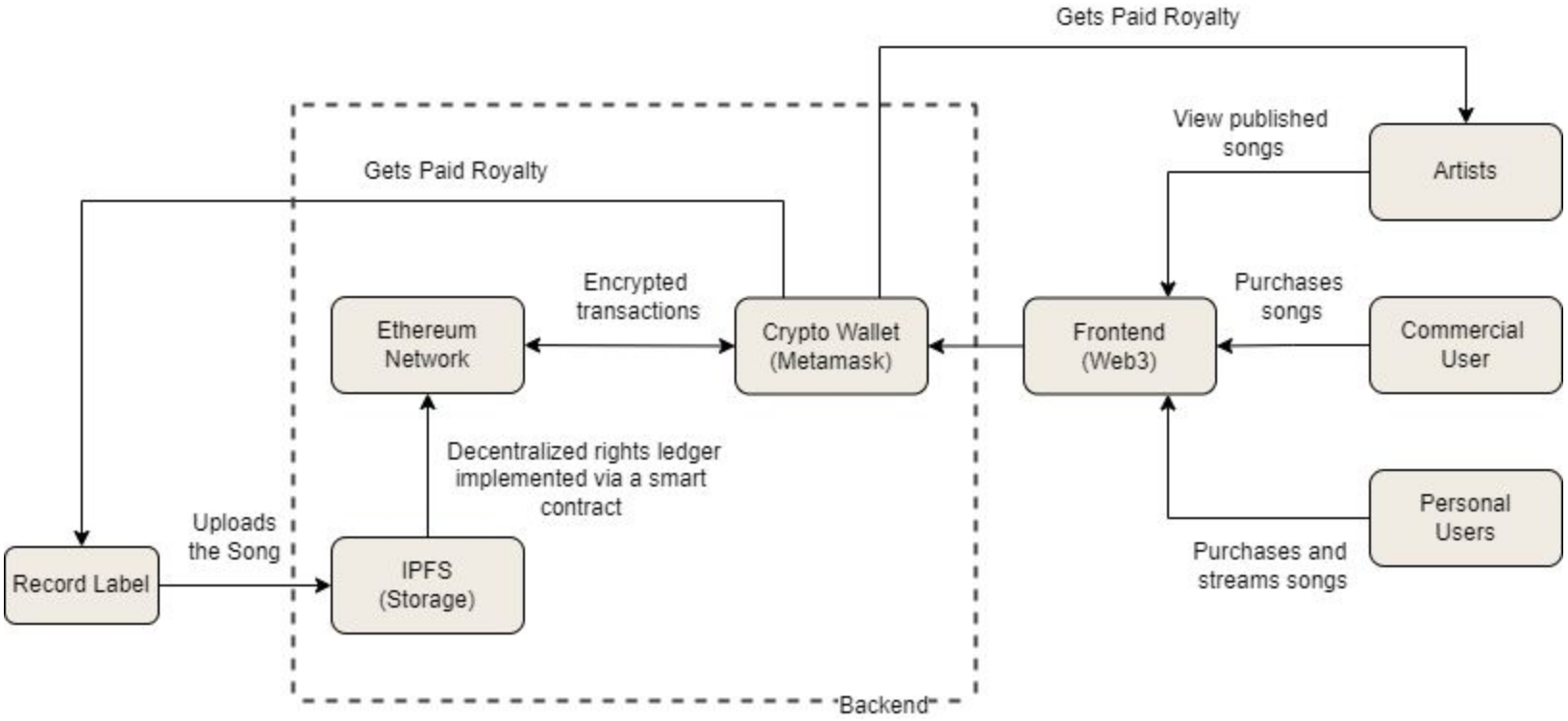
Ref	Year	Research Paper Name	Point of Reference	Analysis
3	2023	Blockchain based digital rights management systems: Design principles for the music industry	The paper proposes design principles for blockchain-based DRM systems that provide an integrated and flexible solution by enabling transparent music licensing structures, consistent and complete rights metadata, and efficient and royalty payout. [3]	(1) **Store public metadata on a distributed ledger** : The evolution to on-demand music streaming, together with the absence of a global rights database, has resulted in the development of complex licensing processes over time, which are error-prone and time-consuming. [3] (2) **Validate metadata via a consensus mechanism on a permissioned blockchain** : Various organizations in the music industry currently maintain separate databases, leading to inconsistent and incomplete music metadata. [3] (3) **Algorithmically enforce royalty payout via stablecoin** : Complex licensing structures and dispersed metadata lead to massive delays in the payout of royalties to rights owners, with one billion US dollars annually unallocated. [3]

Proposed Statement

- Current music royalty distribution models lack transparency, leading to unfair artist compensation and limited access for consumers. Our project addresses these issues, introducing a decentralized platform to revolutionize music distribution, ensuring fairness, security, and creativity for all users.
- Features of a blockchain-based DRM system include:
  - Blockchain Security
  - User-Friendly Gateway
  - Content registration
  - Record Label Catalog Management
  - Royalty distribution
  - Smart Contract Automation

Work Flow of the system

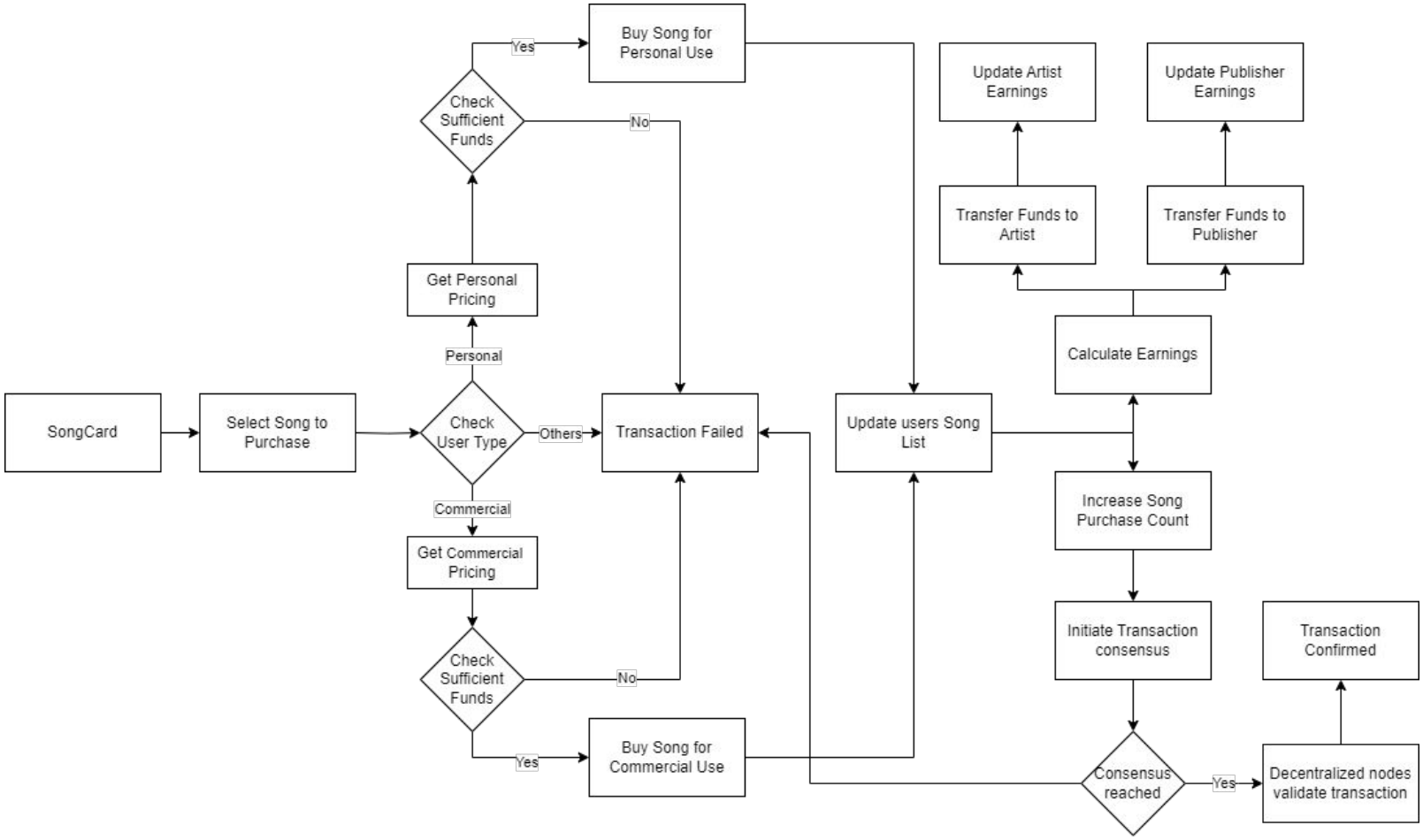
Block Diagram



Experimental Setup

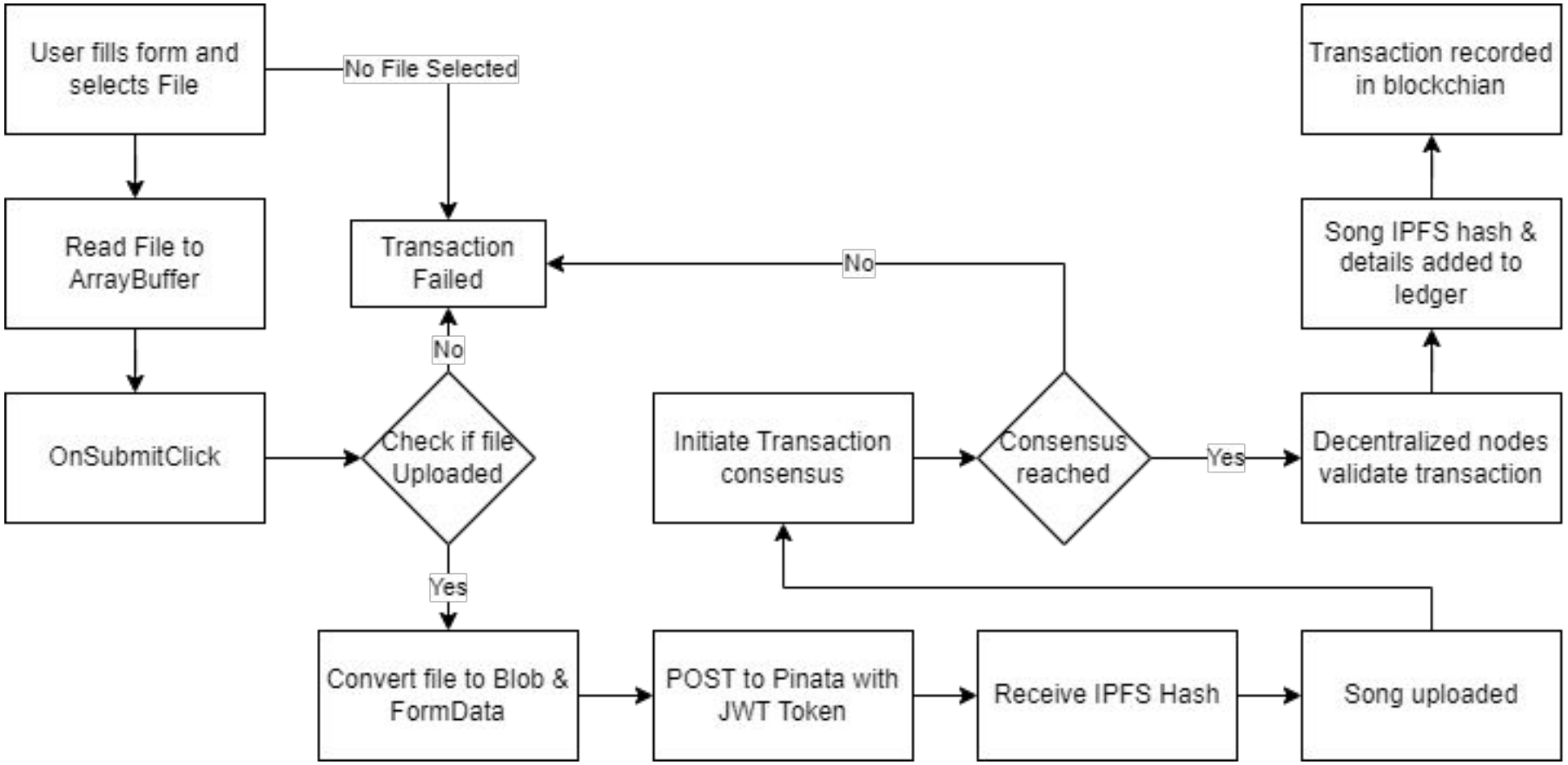
- **Hardware Specifications:**
  - Operating System : Windows 10 or above / Mac OS.
  - RAM : 8GB or above.
  - CPU : Intel core i5 9400F and above.
  - Memory : 250GB SSD.
  - Screen Resolution : 1280 x 800 minimum.
  - Internet : Minimum of 1 Mbps.
- **Software Specifications:**
  - A web browser like google chrome or Microsoft edge.
  - VS Code or other user-friendly interfaces like Komodo IDE, Mobirise.
  - Ganache : A testing blockchain environment.
  - MetaMask or any other cryptocurrency wallet used to interact with the Ethereum blockchain.

Results and Discussions



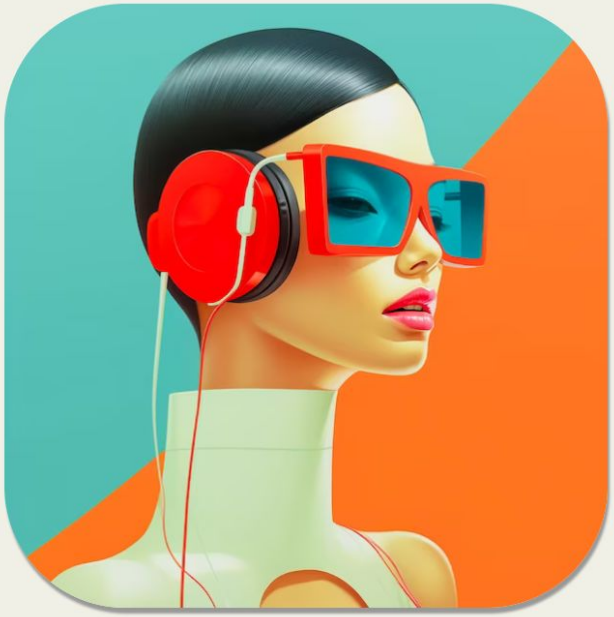
Buy Song Functionality

Results and Discussions



Add Song Functionality

Results and Discussions



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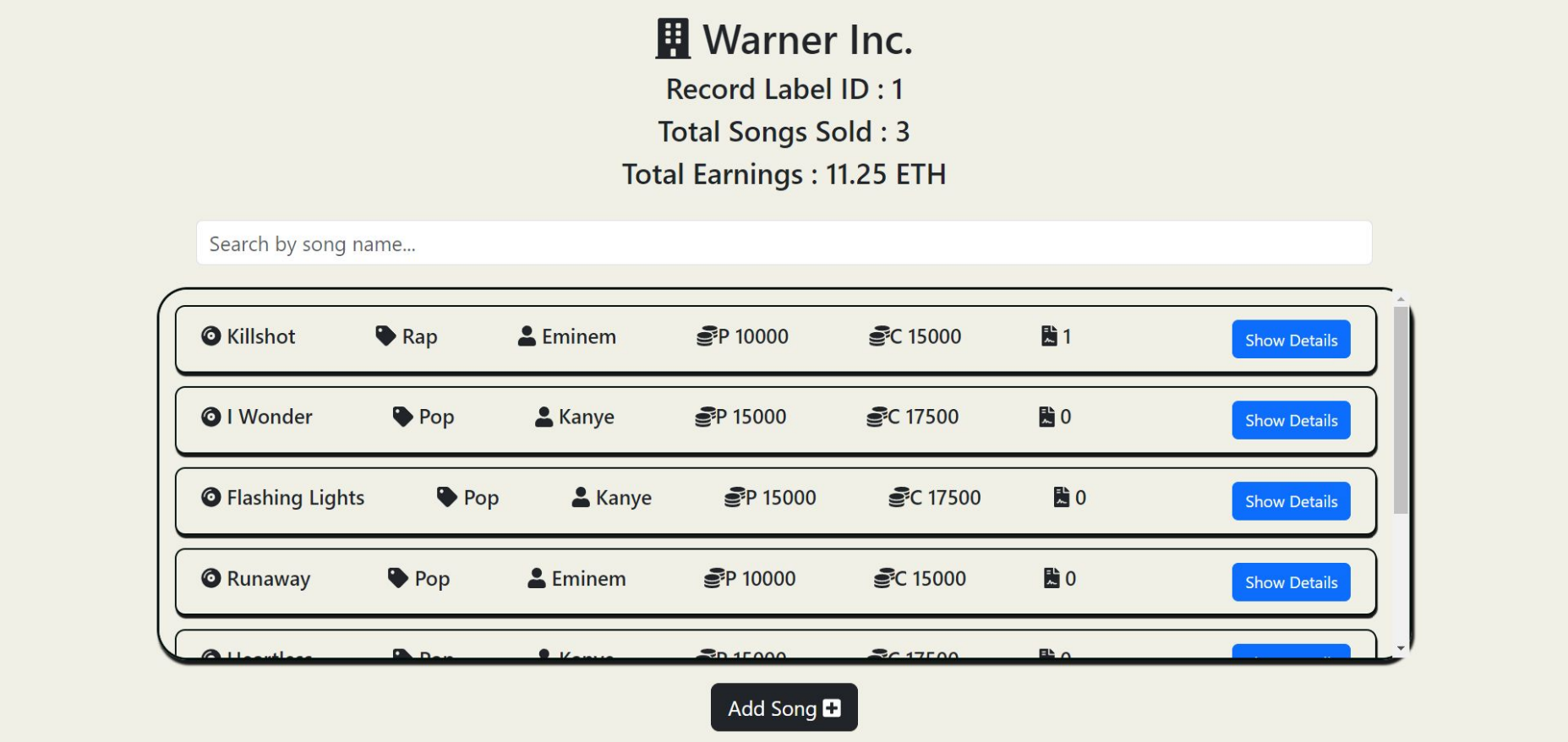

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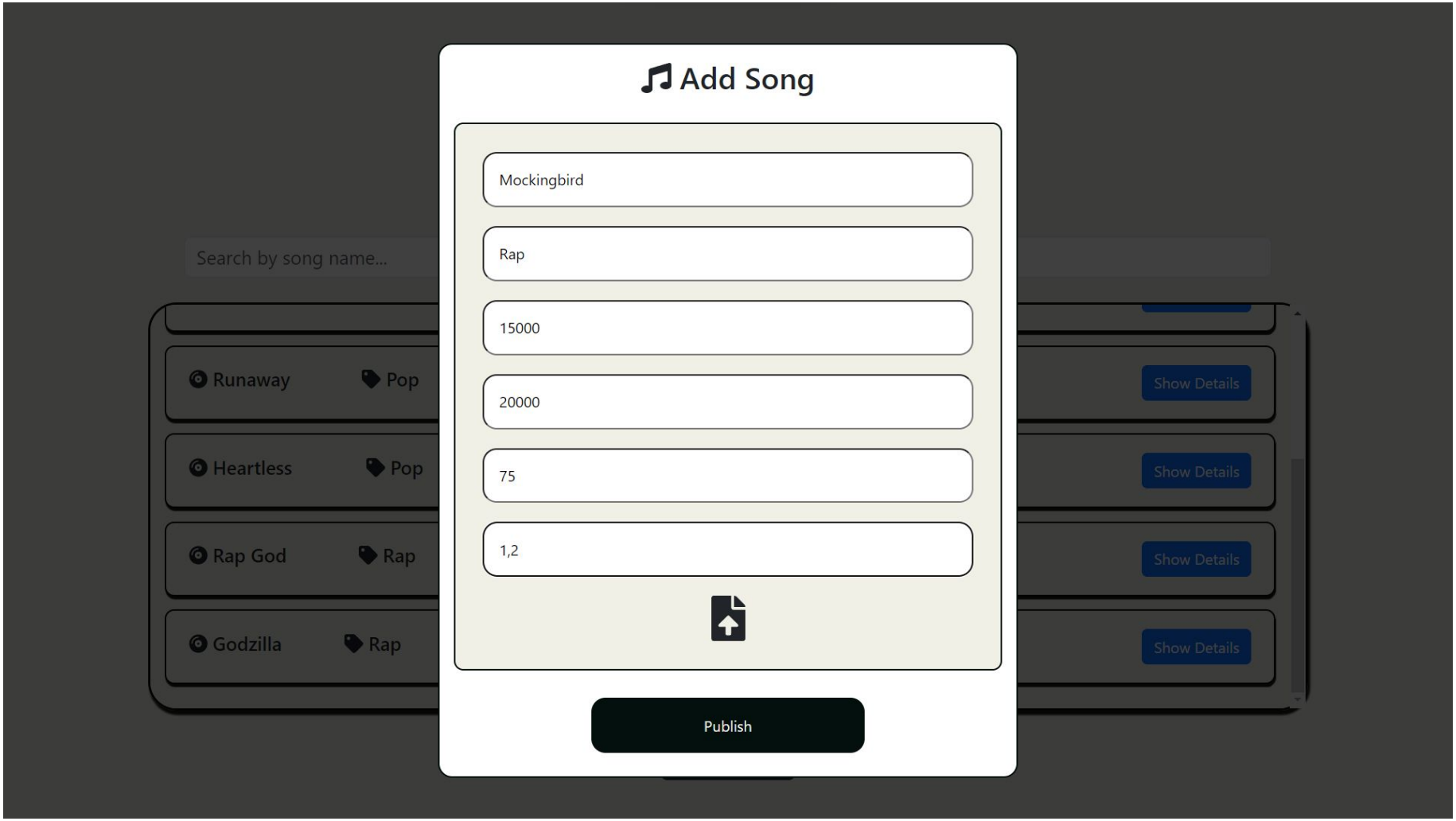

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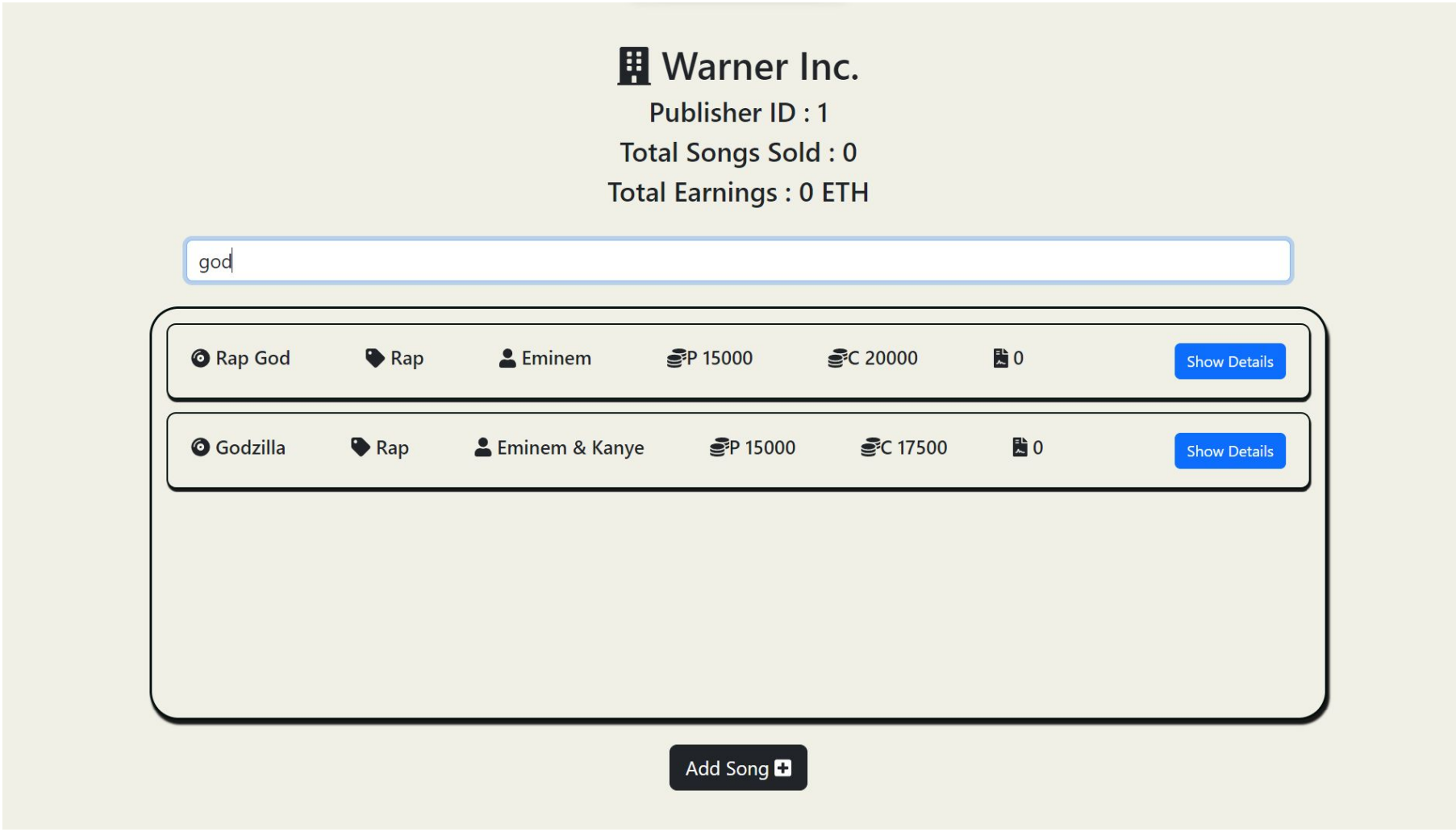

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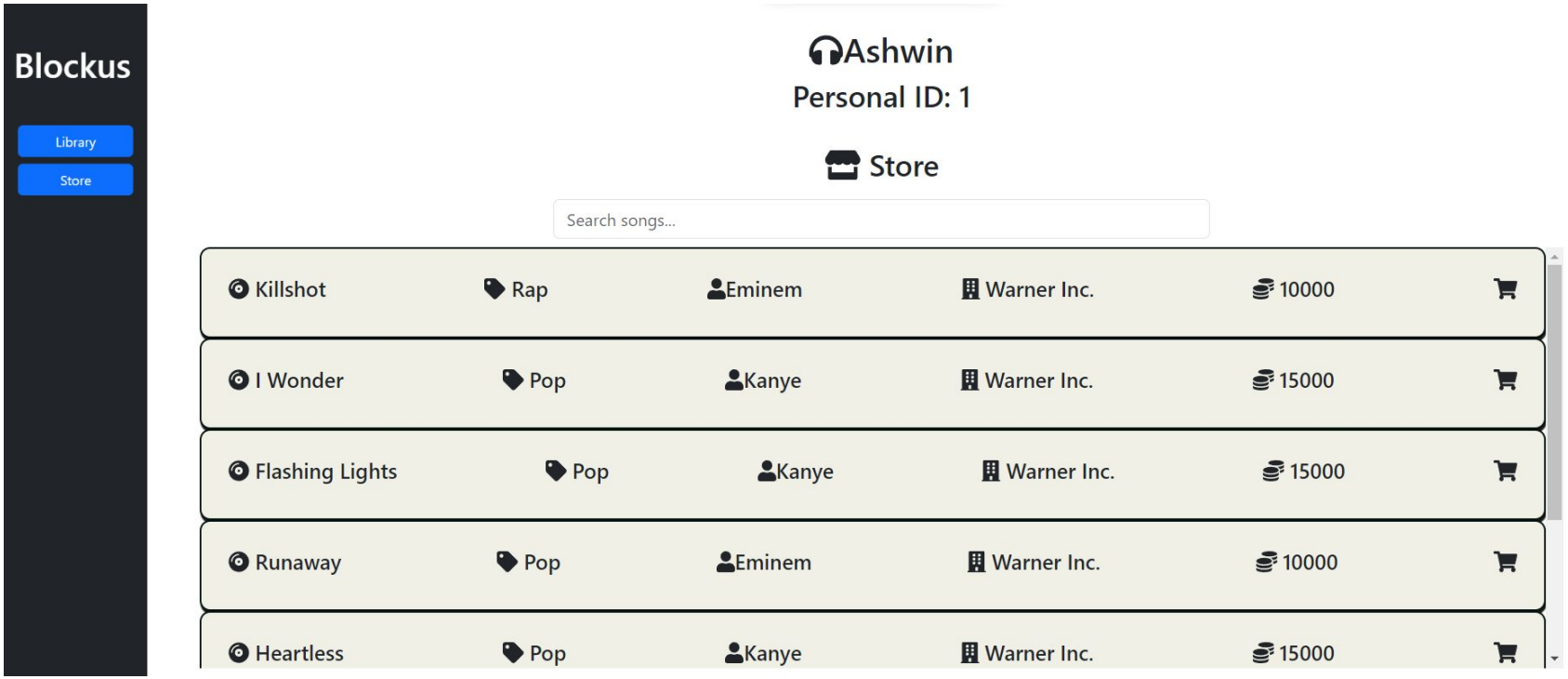

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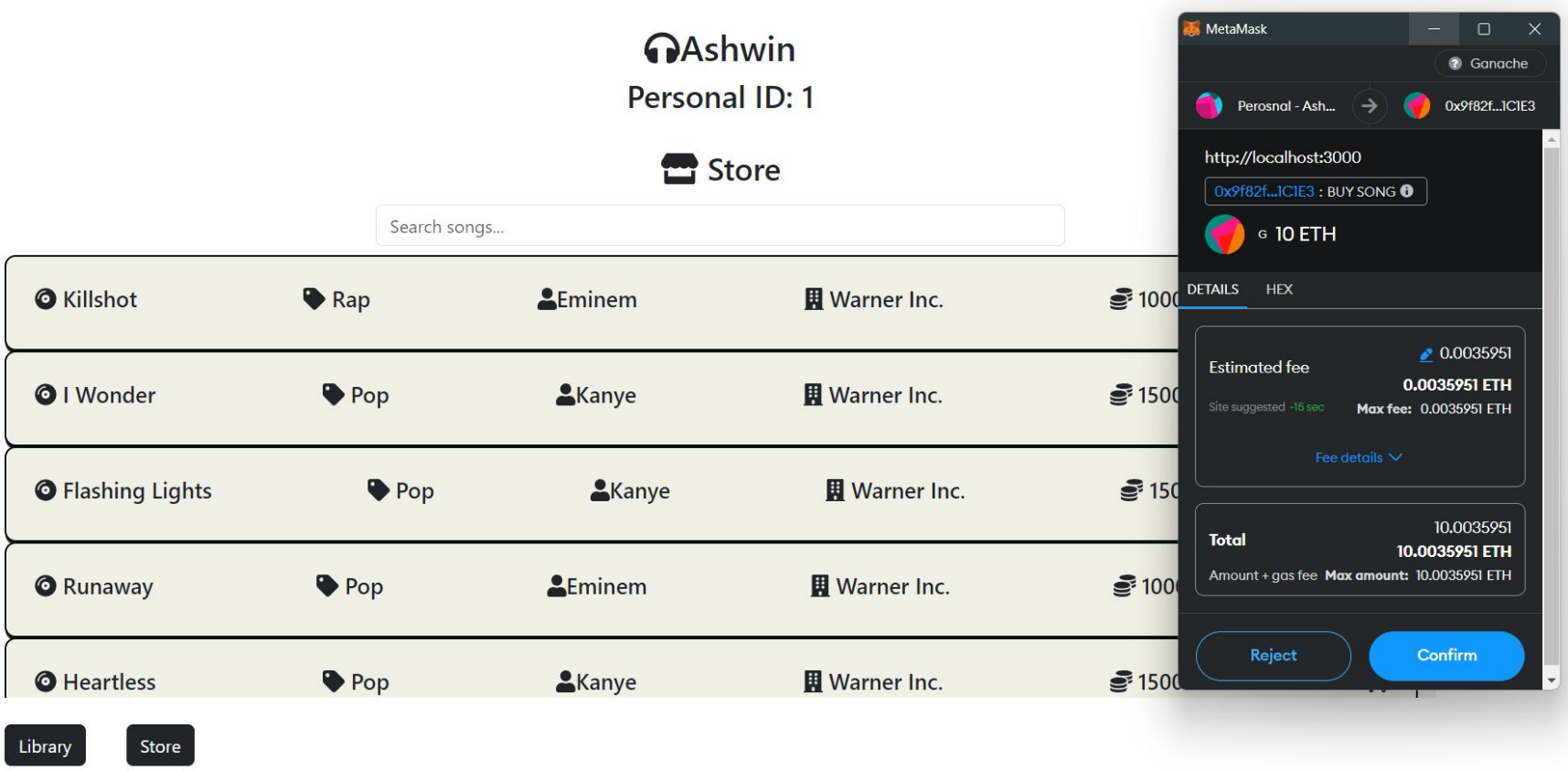

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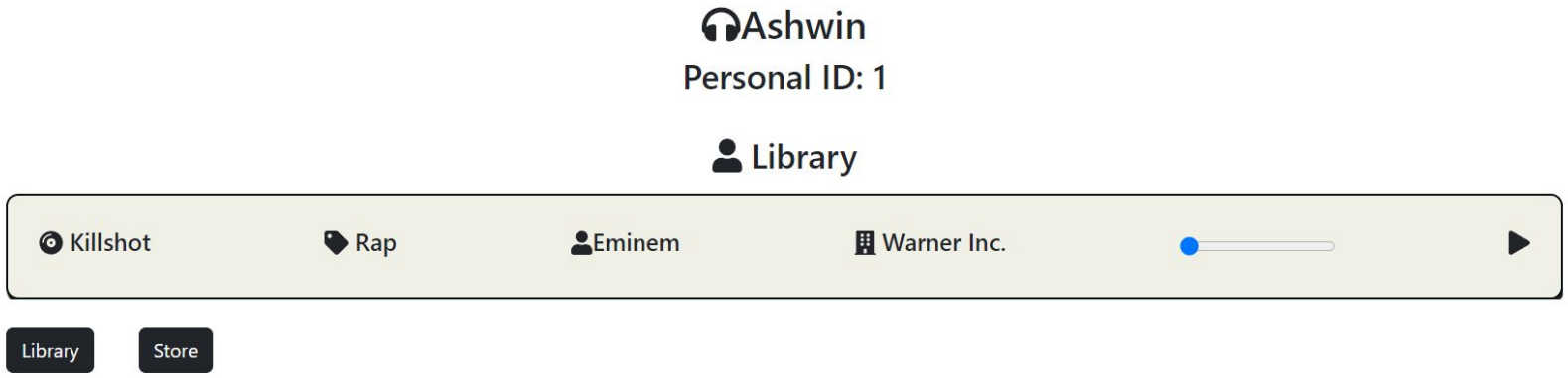

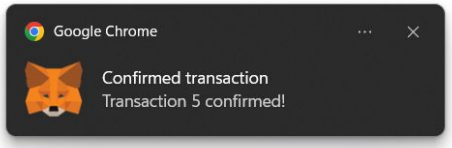

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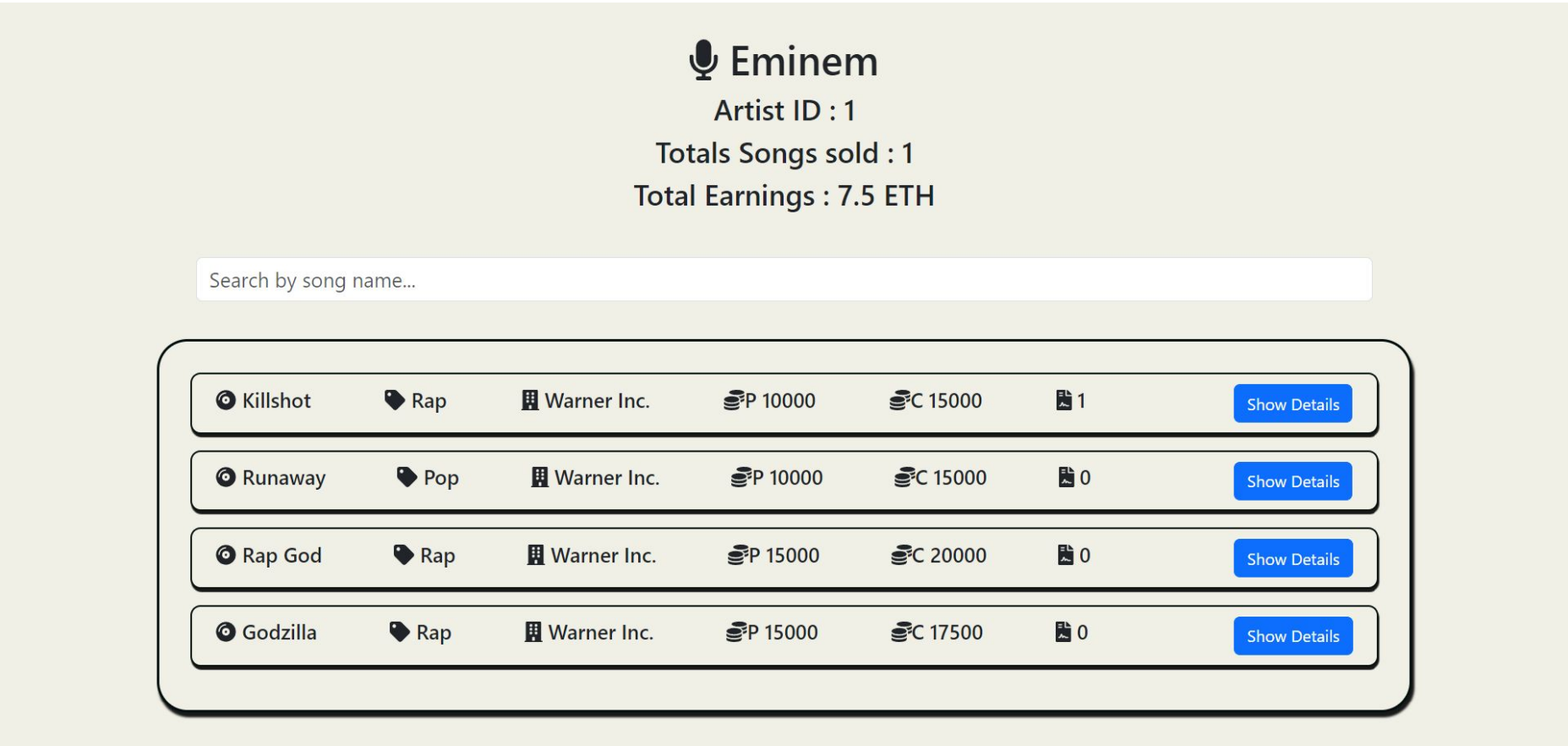

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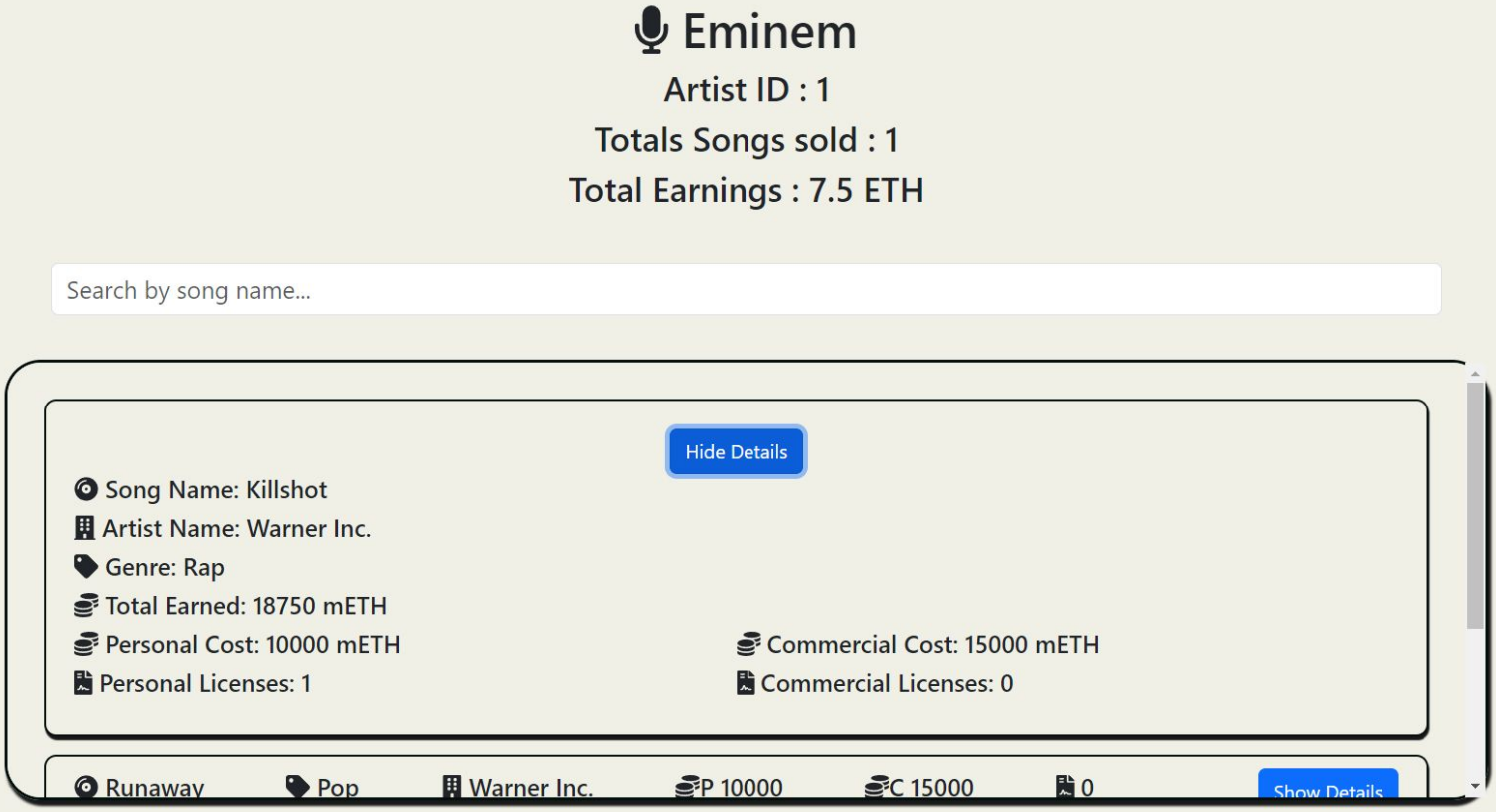

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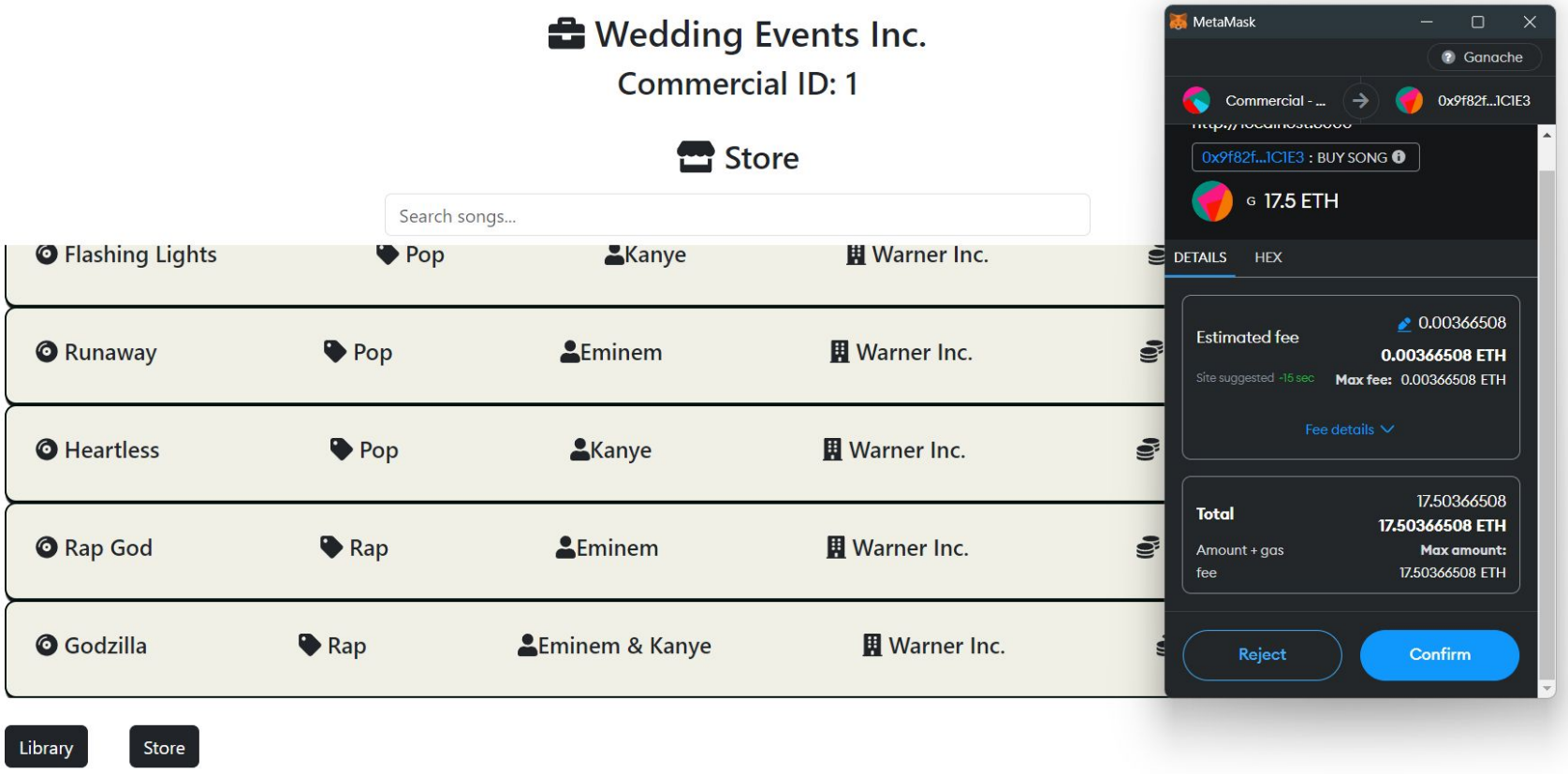

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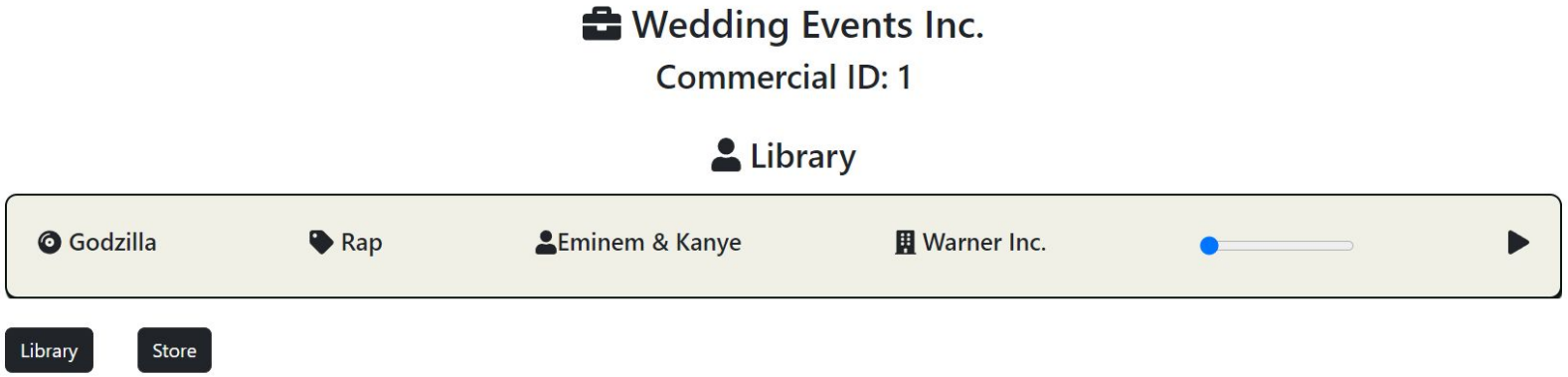

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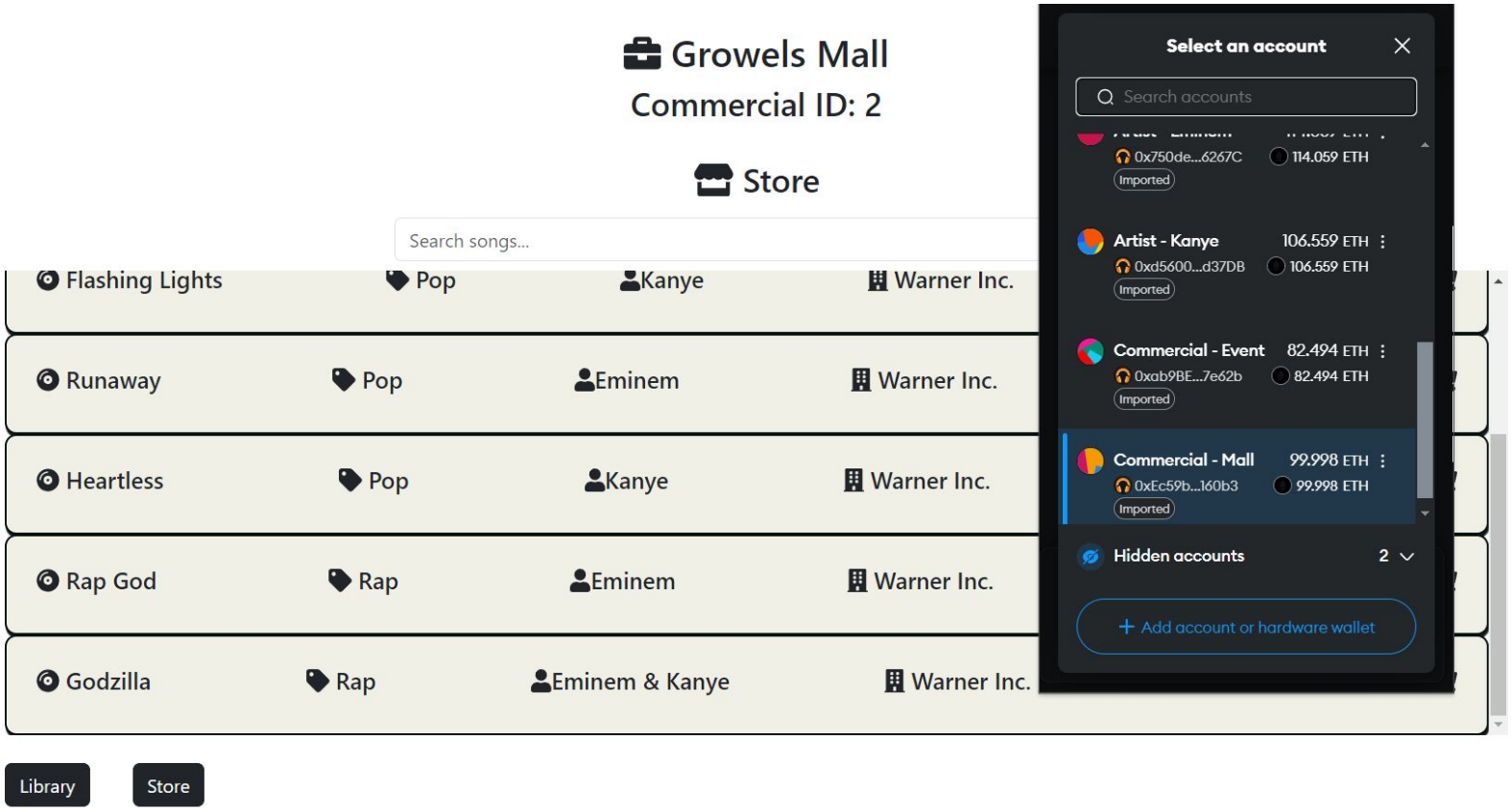

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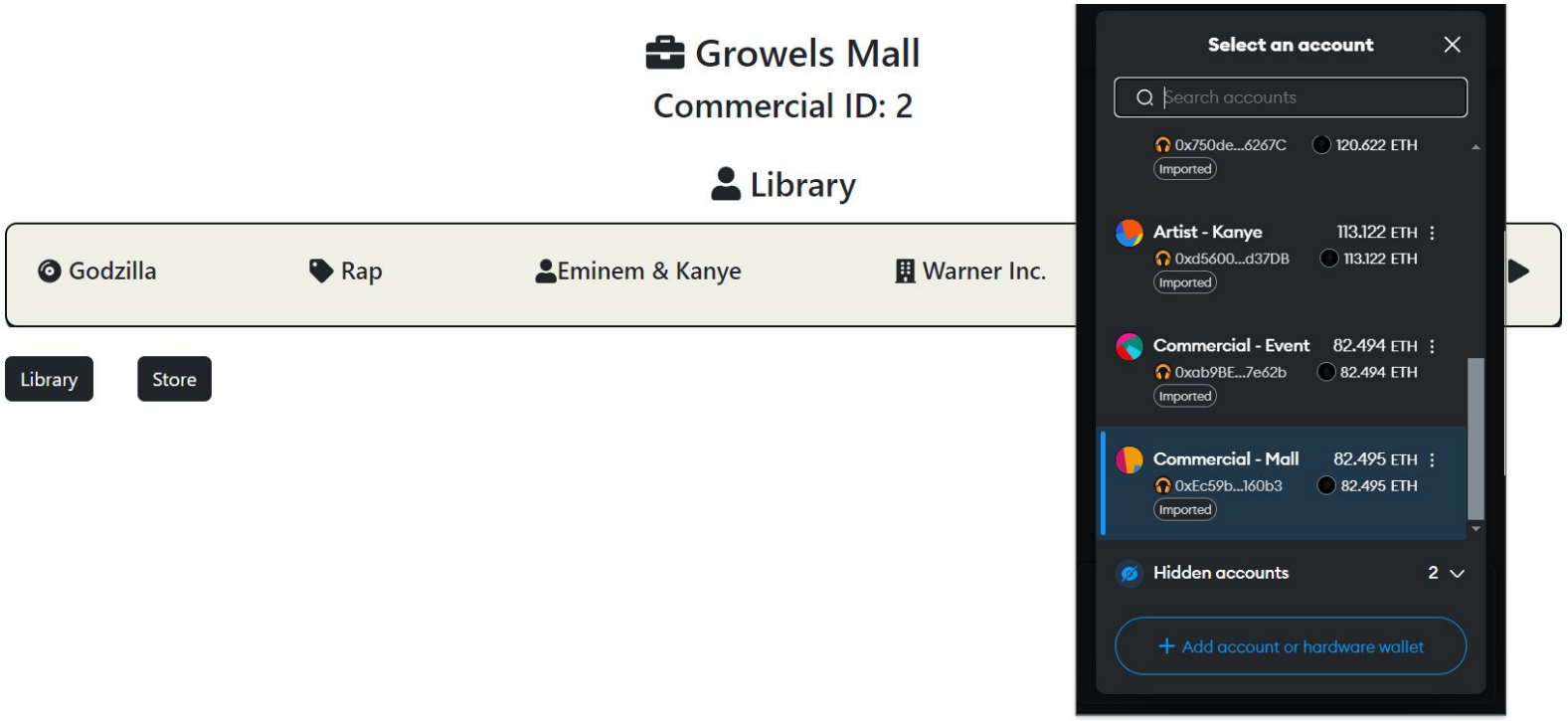

Conclusion

- The Blockchain-Based DRM Management System represents a significant advancement in addressing the complex challenges of the modern music industry through blockchain technology.
- Its implementation ensures transparency, security, and efficiency in managing digital rights, royalties, and music licensing, benefiting artists, record labels, users, and commercial entities.
- The system's use of smart contracts automates royalty payments, ensuring fair compensation for stakeholders and improving the efficiency of the music ecosystem.
- Future enhancements should focus on addressing scalability, processing times, legal implications, and user verification to ensure the system's effectiveness and integrity in real-world applications.

References

[1]Moreira, Maria Alice Bosseljon Roche. Innovating in the music industry: Blockchain, Streaming & Revenue Capture. Diss. (2020)

[2] Adjei-Mensah, Isaac, et al. "Securing music sharing platforms: A Blockchain-Based Approach." arXiv preprint arXiv:2110.05949 (2021).

[3] Ciriello, R.F., Torbensen, A.C.G., Hansen, M.R.P. et al. Blockchain-based digital rights management systems: Design principles for the music industry. Electron Markets 33, 5 (2023).

References

[4] Pastukhov, Dmitry. "Soundcharts | Market Intelligence for the Music Industry." *Soundcharts.com*, 20 Nov. 2019, www.soundcharts.com/blog/how-the-music-publishing-works. Accessed 24 Oct.2023.

[5] “Blockchain: Forging the Future of Asset Management.” BDO, 17 Aug. 2020, www.bdo.com/insights/industries/financial-services/blockchain-forging-the-future-of-asset-management. Accessed 24 Oct. 2023.