Swinburne University of Technology

Project Design Document

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1 PROJECT BACKGROUND AND INTRODUCTION

Non-fungible tokens (NFTs) have revolutionised digital ownership and transformed how we perceive creativity and value in both the technology and art landscape. This fusion of blockchain's immutability, with digital art's fleeting essence has established an easily verifiable authenticity and source, offering fresh prospects for creators, collectors, and enthusiasts.

The rapid growth of the NFT market highlights the need for a specialised and proficient NFT trading platform. Online marketplaces often need more expertise to meet the unique demands of NFTs, including validating the NFT origin and safeguarding digital asset integrity. This NFT trading platform strives to be a sanctuary for creators seeking to immortalise their digital works and collectors aiming to uncover and obtain exclusive digital pieces.

Beyond the transactional features, our platform wants to develop into an immersive environment where technology and art coexist. It aims to facilitate communication between artists and collectors to promote community and engagement, like conventional art galleries.

The core of this endeavour is security. Every NFT's origin, ownership history, and metadata are kept tamper-proof and transparent thanks to blockchain technology. Smart contracts revolutionise how artists are paid for their work even after the initial sale by enabling automated royalty payments whenever their NFTs change hands. Embracing decentralised storage solutions also guarantees the preservation and accessibility of digital assets without reliance on a single point of failure.

The democratisation and decentralisation of the NFT space depends heavily on the user experience. Both experienced blockchain artists and tech-savvy collectors will be able to navigate the platform thanks to its user-friendly interface. The platform might offer educational materials to close the information gap and give users the confidence they need to conduct NFT transactions. Additionally, seamless integration with different cryptocurrencies for transactions guarantees a hassle-free user experience for users everywhere.

The proposed trading platform aims to be at the cutting edge of innovation as the NFT ecosystem develops. It envisions partnerships with artists, creators, and technologists to explore the unknown waters of virtual reality exhibitions, AI-generated NFTs, and interoperable NFT standards that go beyond blockchain boundaries. By embracing these innovations, the platform aims to influence the digital art realm and how societies value and exchange cultural artifacts in the digital era.

In conclusion, developing an NFT trading platform is a cultural and creative movement rather than just a technological one. It creates new links between artistic expression, technology, and interpersonal interaction by bridging the gap between it and the blockchain-powered future. This project aims to contribute to the ongoing discussion about the transformative potential of NFTs and their lasting influence on our world.

2 TEAM INTRODUCTION

We are a team of computer scientists from Swinburne University, brought together by our shared dedication to innovation and technology. As students pursuing our Bachelor of Computer Science degrees, we are excited to embark on the journey of creating an NFT trading platform that seamlessly merges the worlds of art, technology, and finance.

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Collectively, we bring a fusion of technical competency, design finesse, and strategic thinking to this project. With our education at Swinburne as the foundation, we are eager to learn, collaborate, and make a meaningful contribution to blockchain technology and NFTs.

3 PROJECT REQUIREMENT LIST AND DESCRIPTION

In this section, we will provide the core requirements of this project and demonstrate our understanding of the given system requirements.

3.1 PLATFORM OVERVIEW:

- Develop a user-friendly online platform that facilitates the trading of NFTs within the blockchain ecosystem.
- Provide a secure user registration and login process (using an Ethereum wallet address instead of personal data to comply with the focus of web3).
- Display a visually appealing and intuitive user interface.

3.2 NFT LISTING AND BROWSING:

- Enable users to browse, discover, and explore a wide range of NFTs available for trading.
- Implement search and filter functionality for easier navigation.
- Display information about each of the NFTs, including its title and price.

3.3 TRADING AND MARKETPLACE:

- Facilitate the buying, selling, and trading of NFTs among users.
- Implement fixed price NFT transactions.
- Allow users to view their history.

3.4 SECURITY AND PRIVACY:

- Prioritize the security of user data and transactions.
- Implement encryption for sensitize user information.
- Conduct regular security audits and updates.

3.5 RESPONSIVE DESIGN:

- Ensure the platform is accessible from different devices and screen sizes.

- Design a responsive layout that adapts to mobile, tablets, and desktop screens.

3.6 Future Scalability:

- Plan for future expansion and growth of the platform.
- Develop a modular and scalable architecture increased user traffic and new features.

4 Project Design

This part comprises two sections. The first section will describe our front-end prototype sketches and design drawings, while the next section will offer a high-level overview of our system architecture.

4.1 Front-end prototype – Landing Page

Our landing page features a navigation bar for accessing different page sections. Additionally, we've designed the website to be responsive across various devices.

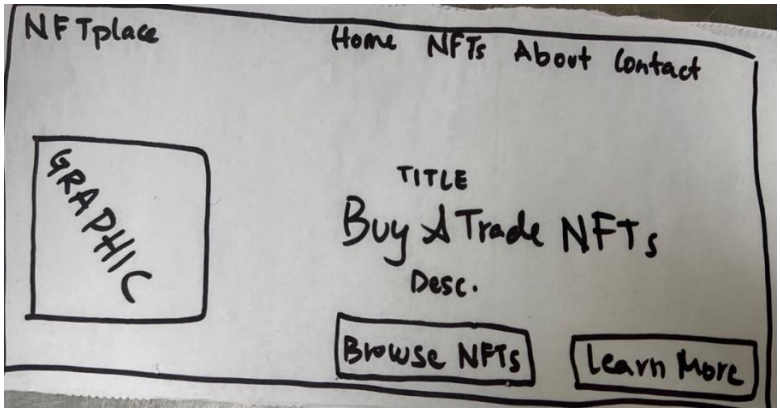

Figure 1: Homepage Wireframe

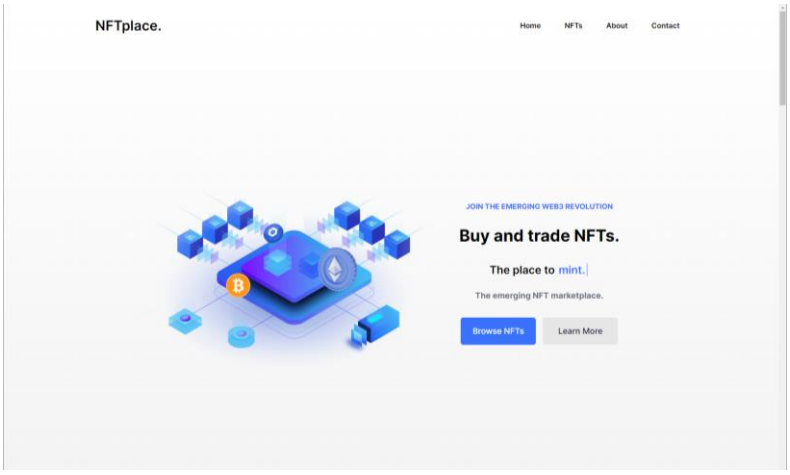

Figure 2: Homepage Desktop

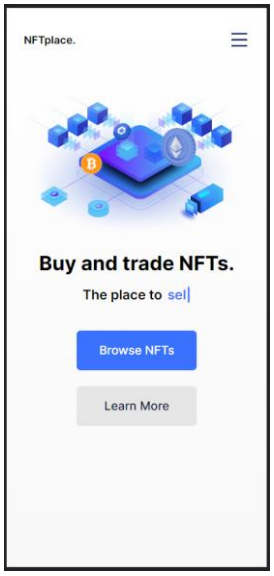

Figure 3: Homepage Mobile

4.2 Front-end prototype – Browsing Page

Users can quickly discover the currently popular NFTs on this page by sorting them based on their names and prices. Furthermore, users will have the capability to search for specific NFTs using their names.

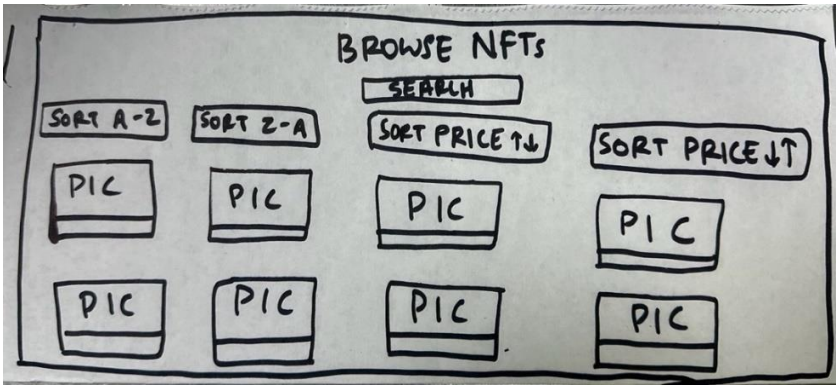

Figure 4: Browsing Page

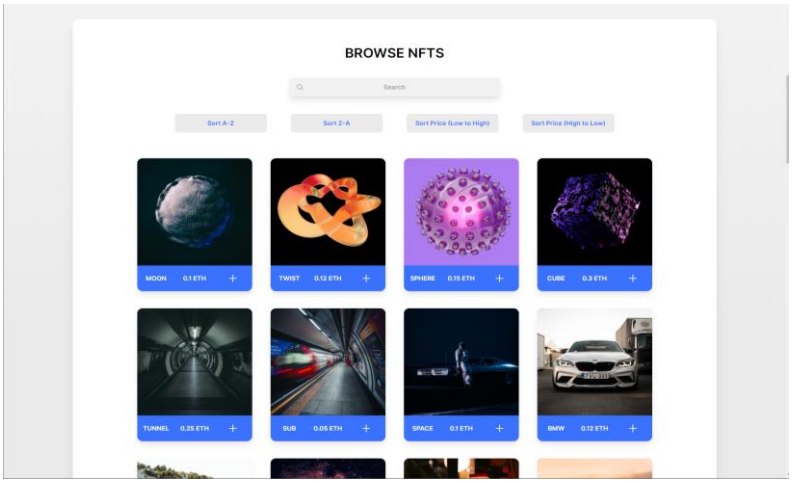

Figure 5: Browsing Desktop

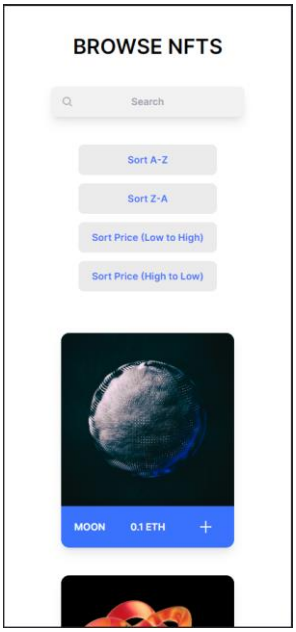

Figure 6: Browsing Mobile

4.3 FRONT-END PROTOTYPE – CHECK OUT PAGE

On this page, the user's NFTs are showcased within the cart, offering the ability to purchase and proceed to checkout. Users have the flexibility to add or remove items from the cart, and the total cost is displayed for their convenience.

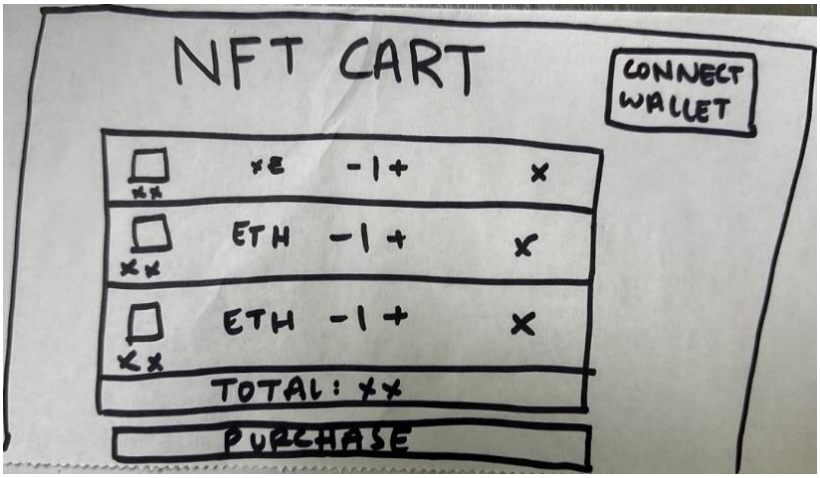

Figure 7: Checkout Page

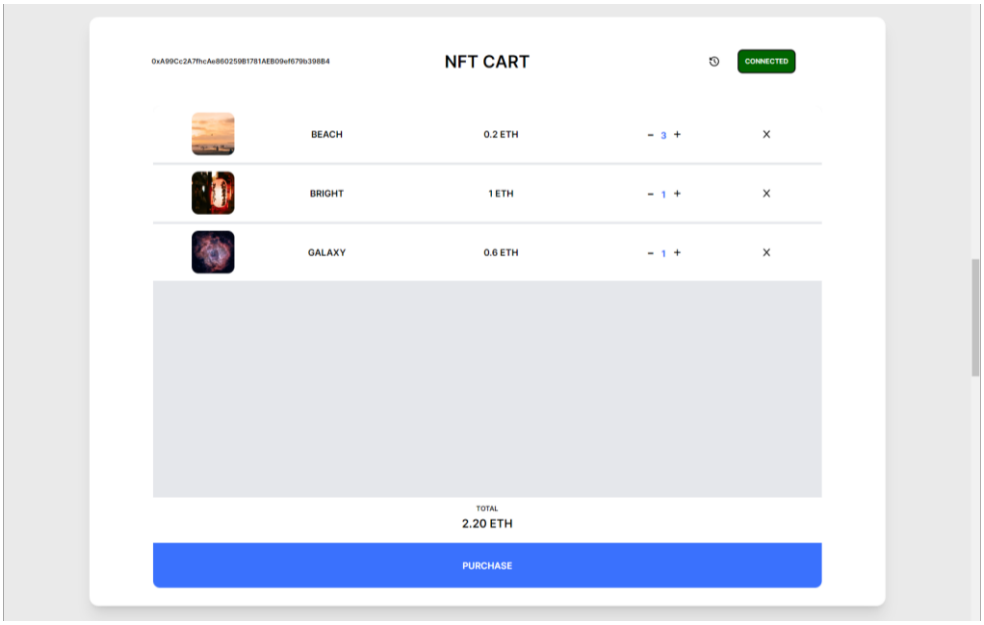

Figure 8: Checkout Desktop

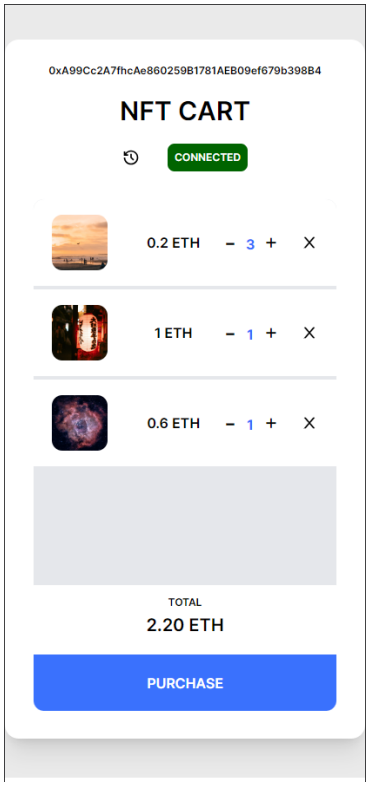

Figure 9: Checkout Mobile

4.4 Front-end prototype – About Us Page

This page aims to provide the user with insights towards NFTs with two focuses in particular; what they are and how they are used. Furthermore, this page delivers a short introduction to the NFTplace brand.

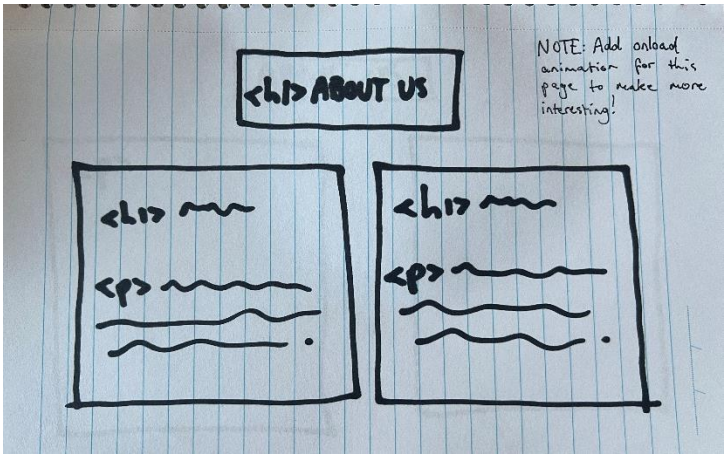

Figure 10: About Us Page

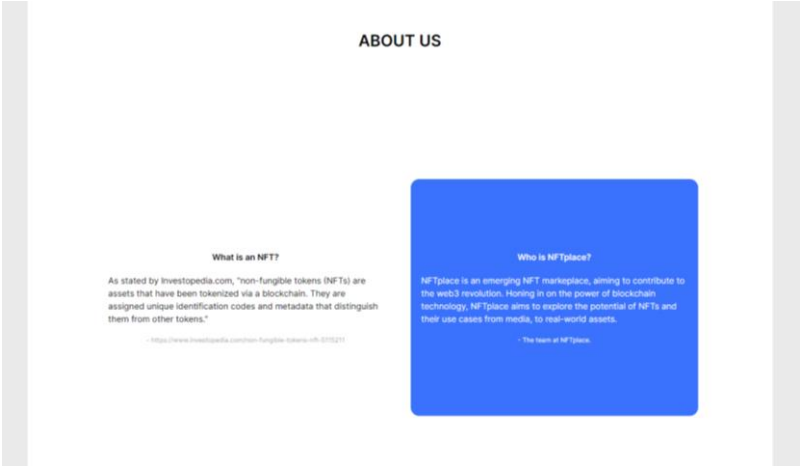

Figure 11: About Us Desktop

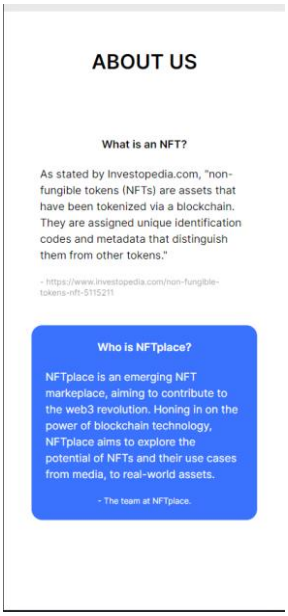

Figure 12: About Us Mobile

4.5 FRONT-END PROTOTYPE – CONTACT PAGE

The contact page contains a form where the user can input contact information and a query, where the query can then be sent to a predefined email address. This will be complete once a backend is configured.

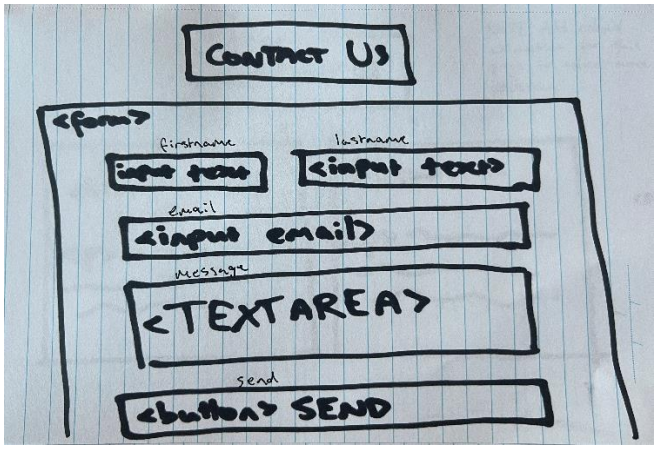

Figure 13: Contact Page

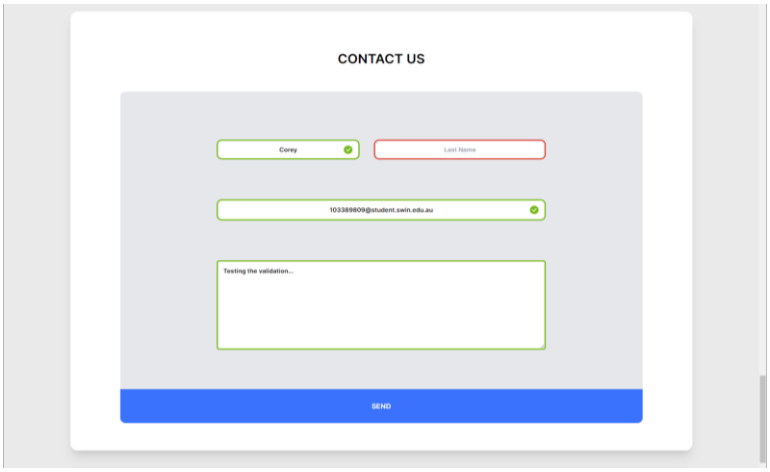

Figure 14: Contact Page Desktop

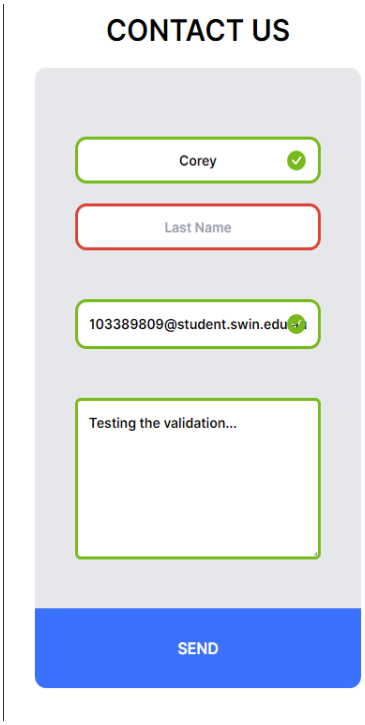

Figure 15: Contact Page Mobile

4.6 Front-end prototype – Transaction History Page

Finally, the transaction history page is opened by selecting the clock icon (a common theme in web3 dApps), where the users transaction history is displayed in a modal. This modal contains the time of transaction, the contract address and a link to etherscan.

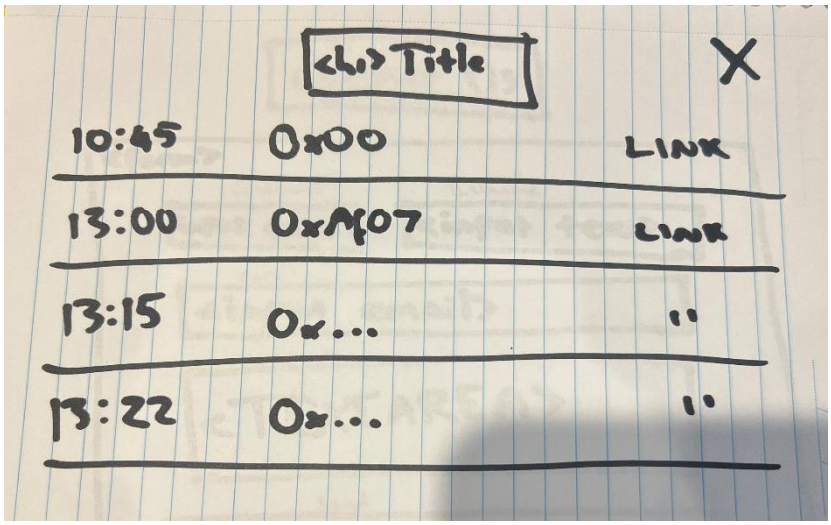

Figure 16: Transaction History Page

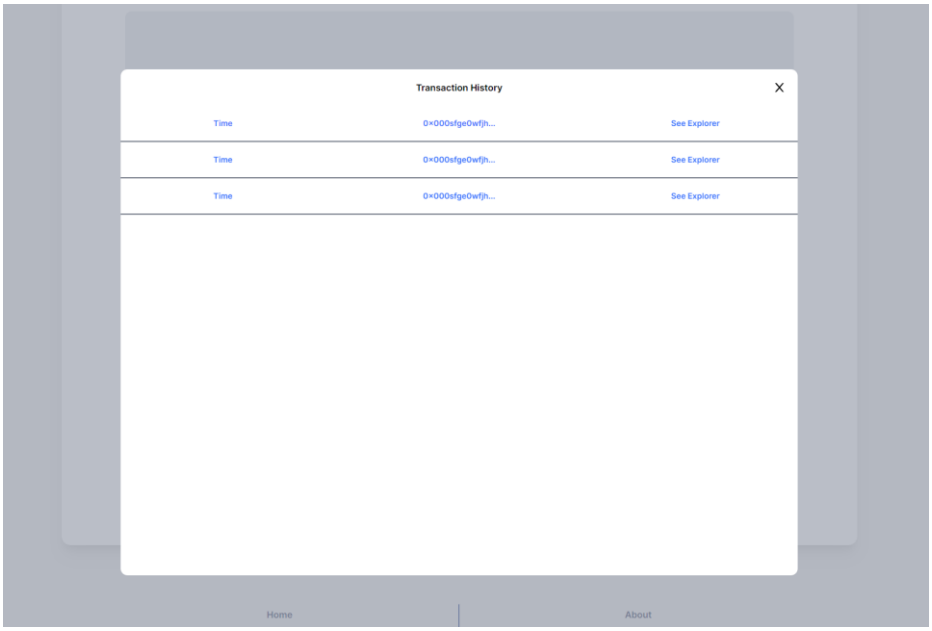

Figure 17: Transaction History Desktop

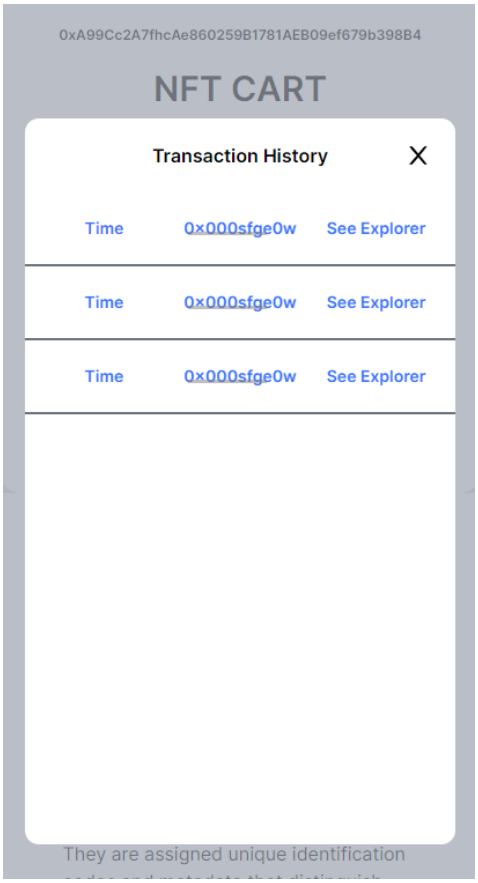

Figure 18: Transaction History Mobile

4.7 OVERALL SYSTEM ARCHITECTURE DESIGN

Users will see a landing page with four sections: Home, NFTs, About, and Contact. The "Browse NFTs" button allows users to select the NFTs they want to add to their shopping cart. Below are two supporting images representing the underlying system architecture of this project.

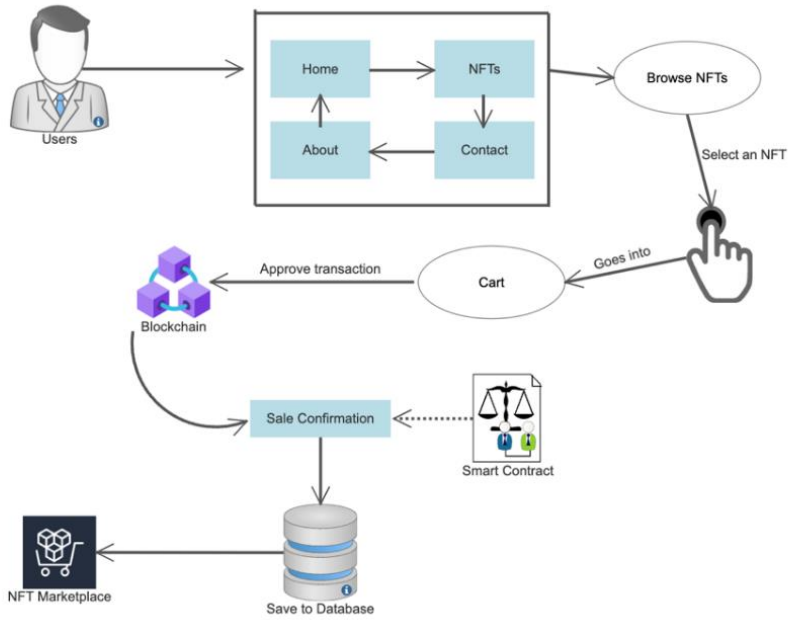

Figure 16: Overall System Architecture Design

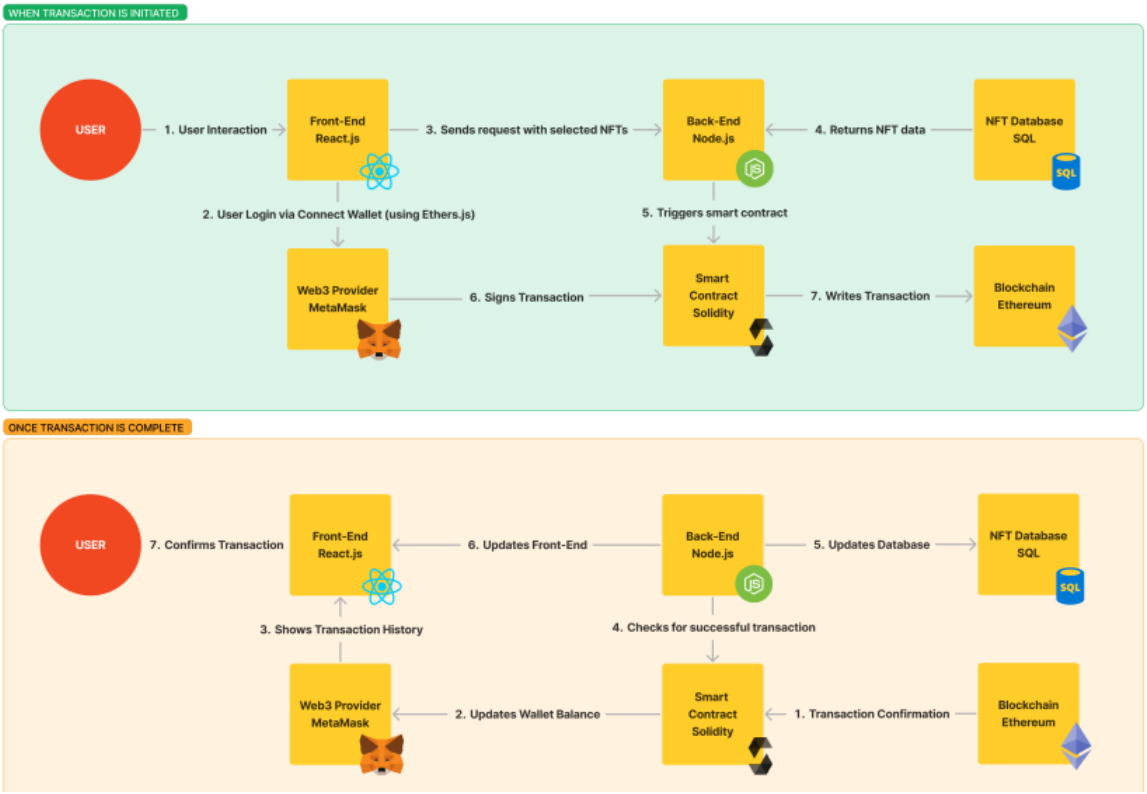

Figure 17 – A high-level overview of the processes occurring during the initiation and completion phases of a smart contract.

5 REFERENCES

Bansal, M. (2022). How to design & then develop an NFT Marketplace — Understanding the Architecture behind it! [online] Coinmonks. Available at: https://medium.com/coinmonks/how-to-design-then-develop-an-nft-marketplace-understanding-the-architecture-behind-it-bdeb8af9fbc2 [Accessed 26 Aug. 2023].

DBInvesting, A. (2023). What are NFTs? How They Can Change the World. [online] dbInvesting. Available at: https://dbinvesting.com/blog/the-rise-of-nfts-how-non-fungible-tokens-are-changing-the-art-world/ [Accessed 26 Aug. 2023].

Sharma, R. (2023). *Non-Fungible Token Definition: Understanding NFTs*. [online] Investopedia. Available at: https://www.investopedia.com/non-fungible-tokens-nft-5115211.

System Architecture Images (created in Figma)

- MetaMask Logo: https://commons.wikimedia.org/wiki/File:MetaMask_Fox.svg# (Accessed 15/08/23)

- Ethereum Logo: https://www.pngall.com/wp-content/uploads/10/Ethereum-Logo-PNG-HD-Image.png (Accessed 15/08/23)

- Solidity Logo: https://commons.wikimedia.org/wiki/File:Solidity_logo.svg (Accessed 15/08/23)

- SQL Logo: https://www.pngwing.com/en/free-png-zoupl/download (Accessed 15/08/23)

- React Logo: https://www.cleanpng.com/png-react-javascript-angularjs-ionic-atom-2904925/download-png.html (Accessed 15/08/23)

- Node Logo: https://www.pngwing.com/en/free-png-nmhof (Accessed 15/08/23)