NFTicket Proposal

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# **Executive Summary**

Digital Ticketing is an industry with a lot of problems. Scalpers suck billions of dollars out of the industry, the appeal of buying and collecting tickets as commemorative souvenirs is behind us and transferring tickets from one another digitally requires jumping through hoops from different vendors. Not to mention purchasing event tickets on the secondary market is just asking to get scammed. Enter NFTicket, an NFT ticketing solution that solves all these problems through the power of smart contracts. Because the tickets are NFTs, vendors can collect royalties on all aftermarket sales, and aftermarket purchases are always guaranteed to be legitimate. Through the NFTicket platform, vendors can create their own tickets, users can buy and sell tickets to one another, as well as send and receive tickets as easily as typing in a username. There is no differentiation between a ‘vendor’ and a ‘user’ either, enabling anyone to create tickets for any event they choose. In addition, because the tickets are NFTs, they are not restricted to any one platform, even the NFTicket platform itself. Users can also buy and sell tickets on any other NFT market like OpenSea, and import them into the platform. Each ticket can be exported to a user's personal wallet, where they have full control over it. However, they don’t need to do this, as each user also has a wallet embedded into the platform, abstracting the technology away from the end user, and leaving them only with a seamless ticketing experience.

# **Problem Statement**

The current state digital ticketing systems leaves much to be desired. Digital tickets currently, unlike a physical ticket which you can simply hand to another person, are not very easy to transfer from one person to another. Typically, it will require jumping through hoops, signing up for services, to finally get a digital ticket consisting of little more than a QR code sent to your email. Furthermore, digital tickets cannot be collected by event goers. Gone are the days of getting a physical ticket, and keeping it for sentimental value, or to frame with something to commemorate an event. Not to mention the secondary market for digital tickets is fraught with scammers, as there is no guarantee someone will send it to you after you send them money. This is only worsened by the scalpers that buy out as many tickets to popular events as they can in order to sell them for a higher price, at the detriment of both the vendor and the consumer. Also, for smaller events, providing tickets can be prohibitively expensive, not to mention difficult to implement, as the tickets must be distributed without fail to all event goers. As it currently stands, digital tickets are issued using something like a database to keep track of ticket owners, ticket ids, whether they have been used, etc. This falls short, as the ticket holder has no real ownership over that ticket. They may be able to print out an email receipt, but that is not the same as having an actual ticket like you would with a physical ticket. With an NFT ticket, once the ticket is redeemed, it becomes a collectible that can be owned. Furthermore, in the ticket resale market, it is very easy to scam people and get scammed because transferring ownership is not built into the digital ticket as easily as it is when leveraging blockchain. Finally, working with ticket vendors to supply tickets for an event can be prohibitively expensive for some budgets. With NFTicket, a user can easily create an event and generate tickets for it for a fraction of the cost. In short, digital tickets as NFTs are a natural evolution of digital ticketing, and NFTicket aims to make that evolution as easy as possible for organizers and users.

# **Design Objectives**

1. Tickets should be easily transferable from person to person as easily as typing in a username, or wallet address.
2. Tickets should be owned by the person who buys them, and can be collected like a physical ticket
3. Purchasing tickets on the secondary market will be a guaranteed transaction, without the ability to withhold sending of a ticket to the purchaser or attempting to sell a ticket that one does not actually possess.
4. Ticket vendors can earn royalties on ticket sales in the secondary market

# **Major System Requirements and Constraints**

**Requirements**

* R1: The system shall provide a local wallet for the user, as well as the ability to connect a user's own wallet
* R2: The system shall maintain a database of users, and their wallet addresses for easy transfer from user to user
* R3: The system shall allow a user to withdraw tickets to their own personal wallets
* R4: The system shall allow a user to transfer tickets purchased on the secondary market into it

**Constraints**

* SC1: The system shall be easily used on any web browser (mobile or desktop)
* SC2: The system shall ensure that transactions complete in under 1 minute, at little or no cost to the user
* SC2: The system shall be compatible with any EVM compatible network (Ethereum, Polygon, Arbitrum, etc.)

## ***Standards***

* Database shall conform to SQL standard
* Tickets shall conform to ERC-721 standards for non-fungible tokens
* Smart Contracts will be written in Solidity, and will be fully open source
* User wallets shall be Ethereum accounts, with either Ethereum wallet address, or conform to ENS standards
* Ticket QR codes shall be ISO accredited with an ISO 27001 compliance certification

## ***Societal Factors***

* Public health, safety, and welfare**:** NFTicket is designed to benefit society in a few ways. First, to centralize the ticket trading network down to a single site that is easy to navigate. Second, to avoid the scams that currently plague the secondhand buyer for tickets. It is common for people to send pictures of the tickets to multiple people to make the most of their investment. And third, it is intended to create an easy, safe, and reliable way to trade these tickets so only one person can ever use them at a time.
* Social and cultural factors: The societal impact of the project just comes from the simplicity brought to the ticket buying and trading community. Things would be bought from a first party vendor and allow for little to no scams and scalper impact on the website.
* Environmental factors: Since NFTickets would be a mainly online system without any production costs the environmental factor would be extremely limited. It is completely set up on the software side and isn’t a physical item. As a result, the product itself will have no foreseeable consequences on the environment. There is some concern that blockchains have a large environmental impact. The main cause for concern comes from proof of work chains like Bitcoin, which require a great deal of computing power to validate transactions. Ethereum uses a proof of stake, which cuts energy usage by 99.95% as compared to Bitcoin. This results in a negligible environmental footprint.
* Economic factors: NFTickets will not be very cost heavy to make, the servers needed for users and storage will definitely cost some on our part, as well as the pricing for domain names but the making or maintaining of it will not require any direct payment. Should this become a larger company the server space needed will increase and the quality will also go up, therefore making it more expensive, which will hopefully be covered by the money the software makes.
* Global factors: Similar to the first few factors, the global impact would just be a more streamlined, accessible, and reliable way to buy, sell, and trade tickets. Especially with the recent mishap with Ticketmaster and the Taylor Swift concert, it is a good time to switch to a better system.

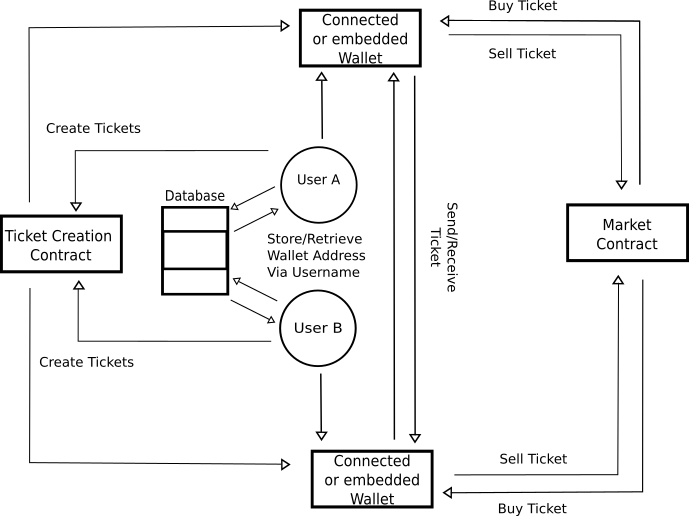
# **Design Concept**

## ***Research and Investigation***

There have been several startups seeking to enter the NFT Ticketing industry, the most prominent being Seatlab (https://seatlab.com/). The difference between Seatlab and our idea is that Seatlab is built on the NEAR blockchain. This sacrifices the security and cross-chain interaction that would be achieved on the Ethereum blockchain for easy development.

Another notable company is GET Protocol (https://www.get-protocol.io/). GET Protocol provides an API for large scale event planners to easily create their own digital tickets, but it is not actually a platform for buying, selling, and sending them. The difference between NFTicket and them is that NFTicket will provide an easy-to-use interface for non-crypto-savvy people to buy, sell and transfer tickets between one another.

## ***Selection of Design Concept***



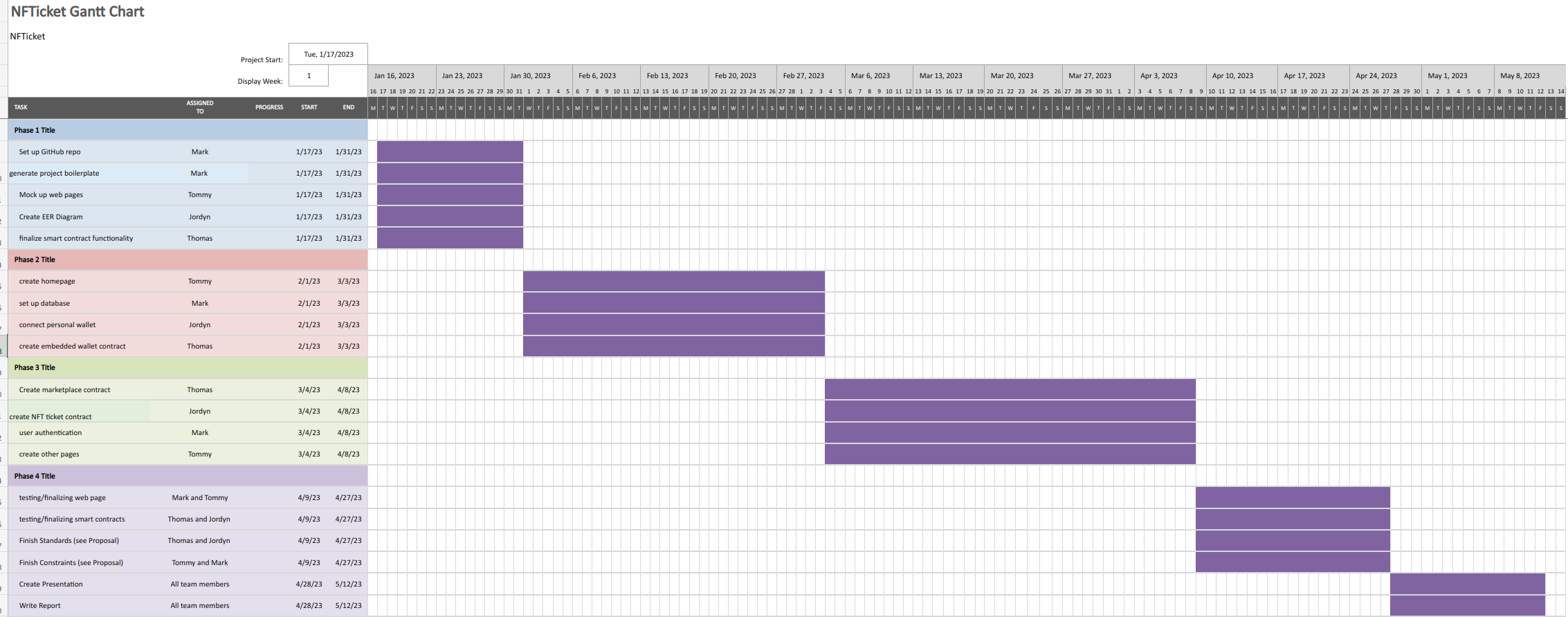
# **Deliverables and Milestones**

## ***Project Deliverables***

* **D1: Smart contracts to implement ticket functionality**
* **D2: Web App to connect to smart contracts**

## ***Schedule and Timeline***

[GANT CHART](https://iowa-my.sharepoint.com/:x:/r/personal/trbutler_uiowa_edu/Documents/School/Fall%202022/senior_design/NFTicket/gant_chart_final.xlsx?d=w7345ad942b7f4f4f84676c2290776e5e&csf=1&web=1&e=zRafDM)



# **Risk Management**

## ***Primary Risks to Project Success***

The most prominent risk to the project success is the learning curve to use the tools and technologies to build the system. While all members of the team have front end web development experience, it is not all in JavaScript, and most of the team has not coded or interacted with smart contracts before. Running out of time to learn the technologies before having a concrete deliverable is a legitimate worry. Also, while Ethereum has established a good reputation in crypto space, the technology is still in its infancy, and the software changes fast, and potentially unpredictably. It is possible that certain expected functionality will be very difficult to implement.

## ***Risk Management Plan***

In the case of bleeding edge technologies with little or poor documentation, team members can revert to older versions of software, as all contracts deployed to the blockchain are immutable. In the unlikely case that the blockchain goes down, NFTicket would have to switch to a different chain. NFTicket can mitigate the blockchain risk by using Ethereum, which is the most trusted and decentralized smart contract platform. For self-governing, team members will have scrum meetings to keep track of everyone's progress and roadblocks. As part of that, team members will use pivotal tracker to assign tasks and keep track of point values for tasks. In the case of an under-contributor, this will be reported in the confidential team dynamic reports, as well as revoke ownership of that person's stake in the design and distribute it among those who have contributed.

## ***Contingency Plan for COVID pandemic***

In the case of a COVID outbreak, all work can be done remotely over Zoom or Microsoft teams.

# **Budget**

For this project, team members plan to budget according to the cost of hosting the webpage publicly. When hosting the webpage publicly, there are two options. The first option is a webhosted website, which is when a company provides a web page web access. Option number two would be purchasing a domain name followed by registering the domain under search engines such as google. The cost of webhosting can range between $7-$20/mo depending on the web host such as godaddy, wix, bluehost aws, and google cloud. The cost of purchasing a domain name would vary around $10/first yr depending on the extension/provider such as .com, .org, and .net.

For the blockchain side, costs vary greatly depending on which chain it is deployed to. Test net chains like Ethereum-Gorelli will require use to use test net currency for deploying contracts and interacting them but will not cost anything regarding actual money. The only costs are when NFTicket deploys to a main net chain and will vary greatly depending on the complexity of the contracts. The currency used will be ETH, so it will also vary depending on the price of ETH in USD. As of November 30th, 2022, the average transaction cost on the Ethereum blockchain was $0.48 - 0.48$ USD. This cost can be lowered even more with layer-2 networks like polygon, the inherit their security from Ethereum, but enable faster, and cheaper transactions, as low as fractions of a cent.

# **Team Considerations**

## ***Knowledge and Skills***

The only skills required for this project are smart contract development, front-end, and back-end web development. Smart contract development includes writing smart contracts in solidity, deploying them to a test network, and then directly to the chain. Web development knowledge includes database knowledge, as well as JavaScript skills including using React to create the web pages, and Web3.js to connect to the smart contracts.

## ***Team Organization and Function***

Roles will be split up in two groups, with two people working on the web-app front-end and back-end, and two people working on smart contracts. The web-app group will consist of Mark and Tommy, while Thomas and Jordyn will work on smart contracts. Team members will hold meetings twice a week to discuss progress and roadblocks, tracking everything on pivotal tracker.

## ***Self-sponsored project***

Since NFTicket is a self-sponsored project and mostly based around software, team members intend to have meetings to go over and review the code done before making any deployments, to have people show us examples, allow for testing, and to make sure our requirements are being met. Team members will also make sure to make a good set of requirements to allow for a complete design of the product in a way that is simplest and most user-friendly. There will be one member who will effectively act as a Scrum Leader (Currently undecided), who helps to assign work and create meetings for these code reviews. Since the work is divided into teams of two, there is a plan to partner program on bigger code changes or more complex functions to make sure the quality of the code is something that will run the software without too many bugs or slowdowns.

Reference: <https://ycharts.com/indicators/ethereum_average_transaction_feeI>