Support Who You Love - SWYL

Software Requirements Specification (SRS) Template v1.0

This document is an annotated outline intended for specifying software requirements and is adapted from IEEE 29148-2018.

Version v1.0

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Prepared For CSC 495

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# Change Log

|  |  |  |
| --- | --- | --- |
| Date | Reason For Changes | Version |
| Sep 18th, 2022 | First SRS initialization   * 1. Introduction * 3. Requirement | v1.0 |
| Sep 20th, 20222 | * Updated 3. Requirement * Updated Appendix A – Tailoring Policies * Replace Appendix B Copyright to Appendix C * Added Appendix B Analysis Models | v1.1 |
| Sep 22nd, 2022 | * Section 4 – Verification first draft * Added Use Case Diagram | v1.2 |
| Sep 23rd, 2022 | * Touched up 1.2 * Touched up 1.3.2 * Updated 3.5 – Logical Database | v1.2.1 |
| Sep 24th, 2022 | * Added activity diagrams | V1.3 |
|  |  |  |

# 1. Introduction

# **1.1 Purpose**

*[Identify the primary reason for the SRS, the system, and the primary audience of the SRS and the system, if they are different. Keep it as short as possible, you will elaborate in future sections.]*

1. **Primary reason**: “Support Who You Love” (referred as **SWYL**) is a web-based music donation/NFT marketplace platform
2. **Primary audience of the SRS**:

* Professor Bastian Tenbergen - Scrum Master **| TBD**
* Nam (Logan) Nguyen –Stakeholder | Project Owner **| TBD**

1. **Primary audiences of the system:**

* Musicians/artists who create music products and sell music NFTs (referred as **CREATORS, ARTISTS, AUTHORS**)
* Users who want to buy music NFTs (referred as **BUYERS**)
* Fans/supporters who simply just want to enjoy and/or donate rewards (referred as **SUPPORTERS**)

## **1.2 Scope**

*[Identify the scope of the SRS document, what will be covered, what will be excluded? Additionally, identify the general scope of the system you are building. Keep these briefs, use bullet points to help organize the information.]*

* **SWYL** covers the activities of:
  + creating and posting music NFTs
  + sending and receiving donations
  + buying and selling music NFTs.
  + transferring the NFTs’ ownerships from one party to another
  + hosting a digital community with membership plans
  + Interacting with community
* **SWYL** excludes the activities of:
  + interacting with other intellectual products that are **NOT** music
  + transferring the **ownership** of the music from one party to another
  + auctioning music NFTs

## **1.3 Product Overview**

### 1.3.1 Product Perspective

*SWYL* is a standalone full-stack web application and is not a part of any larger system.

### 1.3.2 Product Functions

*[This section of the document is intended to describe all the major functions the product will be able to perform. Functions should be organized in such a way that the list of functions is understandable to anyone who is reading through the document for the first time.]*

- **SYSTEM** features:

* A feature that allows users to sign-in with crypto-wallet
* A feature that allows minting NFTs and storing NFTs on blockchain
* A feature that records the original **authors/creators** of the NFTs
* A feature that allows users to configure their own accounts
* A feature to transfer music NFTs from one crypto wallet to another
* A feature allows creators receive donations and royalty rewards instantly and automatically after every transaction

- **CREATORS** accessible features:

* A feature that allows **creators** to configure the metadata for the NFTs
  + MP3 files
  + Cover images
  + Name
  + Description
  + Quantity
  + Price
* A feature that allows **creators** mint music NFTs with its metadata
* A feature that allows **creators** add royalty fees to their NFTs
* A feature that allows **creators** to post their music NFTs
* A feature that allows **creators** to create digital community
* A feature that allows **creators** to create and manage posts in the community
* A feature that allows **creators** to push their products with restriction
* A feature that allows **creators** to decide if they want to sell the NFTs

- **BUYERS** accessible features

* A feature that allows **buyers** to buy the music NFTs
* A feature that allows **buyers** to re-list the NFTs

- **FANS** accessible features

* A feature that allows **fans** to one-time donate the product & artists
* A feature that allows **fans** to share the products on social media
* A feature that allows **fans** interact in the community
* A feature that allows **fans** with membership to interact with exclusive contents

### 1.3.3 User characteristics

*[Describe the characteristics of the product's intended group of users. Include things such as technical expertise, and any information that may impact usability or accessibility to the product.]*

* **CREATORS, ARTISTS, AUTHORS**: Musicians/artists who create music products and/or sell music NFTs
* **BUYERS**: Users who want to buy and sell music NFTs
* **FANS**: Fans/supporters who simply just want to enjoy and/or donate rewards

### 1.3.4 Limitations

*[Identify any limitations that will impact the development. Include things such as hardware limitations, safety and security considerations, quality requirements, regulatory requirements and/or policies, etc.]*

* **TBD**

### 1.4 Definitions

*[Include any terms and definitions needed to understand the SRS or the System Under Development (SUD), terms placed here should also be placed in the Appendix. Terms should use the full name and the general definition of that term, any abbreviations that will be used in the document and the source should be placed in Appendix 5.2]*

|  |  |
| --- | --- |
| Term | Definition |
| Blockchain | a type of Digital Ledger Technology that consists of growing list of records, called blocks, that are securely linked together using cryptography. |
| Ethereum | a decentralized, open source blockchain with smart contract functionality |
| Polygon | an Ethereum layer-2 protocol and framework for building interconnected blockchain ecosystems |
| Smart Contract | simply programs stored on a blockchain that run when predetermined conditions are met |
| Music non-fungible token  (NFT) | is a music digital asset that can be identified through its unique qualities held within its metadata |
| **TBD** | **TBD** |

# 2. References

*[Include citations to external sources and resources in this section. References to other internal documents can be placed here but should also be referenced in the appendix.*

*Example: ISO/IEC/IEEE 29148.2018, Systems and software engineering*

*Life cycle processes — Requirements engineering]*

**TBD**

# 3. Requirements

*[This section should contain all the software requirements at a level of detail sufficient enough to enable designers to design a system, and for testers to test that system, in a way that satisfies the requirements. Each requirement should be perceivable by users, operators, or other external systems. At minimum, the description should include the inputs and outputs of the system, and all functions performed by the system in response to an input or in support of an output. Specific requirements should include the following characteristics:*

* *Correct*
* *Unambiguous*
* *Complete*
* *Consistent*
* *Verifiable*
* *Modifiable*
* *Traceable*
* *Ranked for importance and/or stability*
* *uniquely identifiable (usually by numbering)*
* *organized in a way that allows for maximum readability*

*The purpose of the requirement is not to dictate design, but rather to guide designers to make the safest, most correct version of the system possible. Do not attempt to build solutions to your written requirements]*

## 3.1 Functions

*[Define the fundamental actions that the system must stake in order to accept inputs and generate outputs. It may make sense to organize or partition the functional requirements into sub-functions or sub-processes, do not expect development to mimic this organization.*

* Validity checks on the inputs
  + The system shall check the validity of a crypto wallet when users try to sign in
  + The system shall check the validity of the input music files when creators want to mint NFTs (shall limit to use only .mp3 file type)
  + The system shall check the validity of the input image files during the process of filling metadata for the NFTs (shall be in the type of .png, .jpeg, .svg, .jpg, etc.)
  + The system shall check the validity of the input metadata for a community post
  + TBD
* Exact sequence of operations
  + The system shall receive the NFT metadata then generate a new NFT on a blockchain network
  + The system shall receive transaction information then generate success/fail notifications
  + The system shall receive the posts’ metadata then generate new posts to the digital communities
  + The system shall receive the input from users to generate comments to posts
  + The system shall receive the input from users to generate reactions to posts
  + TBD
* Responses to abnormal situations including:
  + Overflow
    - If the system experiences data overflow, it shall temporarily stop accepting new inputs
  + Error Handling and Recovery
    - The system shall prompt Page Not Found error message if experiences unregistered routes
    - The system shall prompt Unauthorized error message if users are not authorized to access resources
    - The system shall prompt Bad request error message if users inputs are not valid
  + Database gateway
    - The system shall prompt Server error message if the backend is not function properly
* TBD

## 3.2 Performance Requirements

*[In measurable terms, specify the numerical requirements of the system. Include static performance requirements such as the number of terminals, simultaneous users, etc. As well as dynamic performance requirements such as the number of tasks able to be completed in a set period of time.]*

* The system shall be available and compatible with many web broswers
* The system shall be capable of supporting at least 1,000 users concurrently
* The system shall be able to handle multiple tasks (minting NFTs, listing NFTs, buying NFTs, setting up transaction reports, etc.) during a user session
* The system shall be able to make sure that all visible pages of the system respond in timely manner
* The system shall be able to store more than 100, 000 music NFTs (approximately 10mb/file)
* The system shall be available online for 24/7
* **TBD**

## 3.3 Usability Requirements

*[Define usability and quality requirements that are measurable in effectiveness, efficiency, satisfaction, and in avoidance of harm that could arise from specific use cases.]*

* The system shall conveniently and neatly prompt helpful information about all the abbreviations or technical terms used within the site
* The system shall have a succinct and transparent forms including descriptive content to guide users what shall be done while trying to submit any action
* The system shall have self-descriptive buttons to help users navigate through the site
* **TBD**

## 3.4 Interface Requirements

*[List all inputs and outputs from the system. It should mirror but not repeat the information found in sections 4.2- 4.6. For each defined interface, be sure to include:*

* *the name of the item*
* *description of the purpose of the interface*
* *source of input OR output destination*
* *range, accuracy and/or tolerance*
* *units of measurement*
* *timing*
* *I/O relationships*
* *data formats*
* *command formats*

*any information included within the I/O.] ]*

**3.4.1 Input Interface Requirements**

* Social media interface:
  + Name: community
  + Purpose: offers an e-performance where artists and fans can digitally hang out
  + Source of input: platform users
  + Data formats: JSON
* Registration interface:
  + Name: Registration page
  + Purpose: guides users on how to register for a page
  + Source of input: platform users
  + Data formats: JSON
* NFT registering interface:
  + Name: NFT registering
  + Purpose: guides users to fill out the metadata so that NFTs can be minted
  + Source of input: platform users
  + Data formats: JSON
* NFT buying interface
  + Name: NFT Buying
  + Purpose: provides the guides on how to execute transactions to buy NFT
  + Source of input: platform users
  + Data formats: JSON
* Marketplace interface:
  + Name: NFT marketplace
  + Purpose: offers a marketplace where seller and buyer can interact to buy and sell music NFTs
  + Source of input: platform users
  + Data formats: JSON
* Membership setting interface
  + Name: NFT marketplace
  + Purpose: offers a page where artists can set up membership plans
  + Source of input: platform users
  + Data formats: JSON
* Membership registering interface
  + Name: NFT marketplace
  + Purpose: offers a page where users can register for membership
  + Source of input: platform users
  + Data formats: JSON
* Profile interface
  + Name: profile page
  + Purpose: offers an area for users to showcase their profile
  + Source of input: platform users
  + Data formats: JSON
* Profile settings interface
  + Name: profile page
  + Purpose: offers a wizard where users can configure their information
  + Source of input: platform users
  + Data formats: JSON
* Searching interface
  + Name: search interface
  + Purpose: search for users on the platform
  + Source of input: platform users
  + Data formats: JSON
* NFT history transactions interface
  + Name: NFT history
  + Purpose: show a list of transactions of the NFTs
  + Source of input: platform users
  + Data formats: JSON

## 3.5 Logical Database Requirements

*[Identify the logical requirements for information that will be place in a database.*

* Two main databases || storages:
  + On-chain data (i.e., NFT metadata, marketplace transactions) will be stored on a blockchain network
  + Off-chain data (i.e., users’ data, community data, memberships data, etc.) will be stored on a NoSQL database
* One helper storage
  + Audio files and cover image files are retained in NFT.storage & IPFS
* Types of information that will be used:
  + User data
  + Membership plans data
  + Community posts data
  + Community supporter lists data
  + NFTs’ metadata
  + Marketplace transactions data
* Frequency of use: High
* Accessibility: Always available
* Security:
  + Users’ information stays private and secured inside the database
  + Membership plans data is public to the platform users
  + Community posts’ information is public to the platform users
  + Community supporter lists’ information is public to the platform useters
  + NFTs’ metadata information maintains public and transparent on the blockchain
  + Marketplace transactions’ information stay public and transparent on the blockchain
* data retention
  + On-chain data (NFTs, marketplace transactions, supporter lists, etc.) will be retained firmly and immutably on blockchain network
  + Off-chain data (Users’ information, Community’s information, etc.) will be retained in a NoSQL database
  + Audio files and cover image files are retained in NFT.storage & IPFS

## 3.6 Design Constraints

*[List any constraints on the system. These constraints should be from external sources such as regulatory standards, legal, or project limitations.]*

* The system smart contracts must be compatible with Ethereum Virtual Machine
* The system must be deployed to one of the Layer 2 blockchain network (Polygon)
* The system must not violate Customer and Privacy Act.
  + The system must ensure the user information is private and secured
  + The system must ensure to publish only information that is disclosed with the consent of the user
* The system must be completed within the Fall Semester of 2022
* Only users with crypto wallet can perform NFT-related actions
* NFT music files are not heavier than 10mb
* **TBD**

## 3.7 Software System Attributes

*[For each of the attributes of the software system (Reliability, Availability, Security, Maintainability, Portability, etc.), list the factors that will establish functionality or stability. For example, when establishing requirements for the Security attribute, you may include one that restricts communication between two one area of the program and another.]*

3.7.1 Reliability:

* The system performs correctly in case of failures. Self-detecting and self-healing in case of infrastructure problems, malicious attacks

3.7.2 Availability:

* TBD

3.7.3 Security:

* The system guarantees confidentiality, integrity and protection against malicious attacks

3.7.4 Maintainability:

* The system is simple to operate and evolve over time without major code refactors

**TBD**

## 3.8 Supporting Information

*[Add any additional information needed to understand the SRS, include things like background information, problem descriptions, packaging instructions for code, sample input/output formats, etc.]*

# 4. Verification

*[List all inputs and outputs from the system. It should mirror but not repeat the information found in sections 3.1- 3.8. For each defined interface, be sure to include:*

* *the name of the item*
* *description of the purpose of the interface*
* *source of input OR output destination*
* *range, accuracy and/or tolerance*
* *units of measurement*
* *timing*
* *I/O relationships*
* *data formats*
* *command formats*
* *any information included within the I/O.]*

## 4.1 Functions

*[See sections 4.0, 3.1 for specific directions about what outputs should be included here.]*

**4.1.1 System features**

4.1.1.1 **Sign into the platform**

a. HIGH priority

* + A-1: System shall provide users a sign-in with crypto-wallet wizard to let users sign-in

b. Stimulus/response sequence

* + B-1: User action: Users will be able to sign into the platform with the help of industry-standard crypto currency wallet
  + B-2: System response: The system shell let users sign into the platform to execute transactions

c. Functional requirements

* + C-1: The system shall let users sign into the platform with a valid wallet account
  + C-2: The system shall not let users sign into the platform with an invalid wallet account
  + C-3: The system shall let users to log out of the platform

4.1.1.2 **Save products’ metadata as NFTs on chosen blockchain**

a. HIGH priority

* + A-1: System shall be able to receive metadata input from users and integrate it to the chosen blockchain

b. Stimulus/Response Sequence

* + B-1: User action: Provide valid metadata input
  + B-2: System response: The system shall be able to process the metadata and mint it to the chosen blockchain as NFTs

c. Functional requirements

* + C-1: The system shall provide a form where users can type in the metadata inputs
  + C-2: The system shall ensure that the metadata received is valid in terms of matching data fields correctly, required fields, etc.
  + C-3: The system shall offer users an option to mint only 1 unique NFT
  + C-4: The system shall offer users an option to mint multiple unique NFTs
  + C-5: The system shall offer users an option to modify and add a royalty fee to their NFTs
  + C-6: The system shall be able to process the metadata, create and save NFTs on the chosen blockchain and record the original creator

4.1.1.2 **Listing NFT to showcase and/or for sale**

a. HIGH priority

* + A-1: System shall offer users an option to list new created NFTs to showcase and/or for sale

b. Stimulus/Response Sequence

* + B-1: User action: Provide valid listing choices
  + B-2: System response: The system shall be able to list the NFTs based on listing choices

c. Functional requirements

* + C-1: The system shall list the new created NFTs to creators’ gallery page by default
  + C-2: The system shall be able to process the users’ listing choices then list the NFT either marketplace or profile gallery page based on listing choices
  + C-3 The system shall list the NFTs along with the received metadata

4.1.1.3 **Executing donating transactions**

a. HIGH priority

* + A-1: System shall be able to process and execute donating transactions

b. Stimulus/Response Sequence

* + B-1: User action:
    - Click on the “donate” button to start donating process
    - Provide valid inputs for donating transaction form
  + B-2: System response: The system shall respond with transaction failed or successful message

c. Functional requirements

* + C-1: The system shall be able to process the donating inputs and ensure that the input is valid in terms of matching data fields, valid wallet address, valid amount, etc.
  + C-2: The system shall transfer the donating amount directly to creators
  + C-3: The system shall distinguish direct donating amount and NFT donating amount

4.1.1.3 **Marketplace features**

a. HIGH priority

* + A-1: System shall be able to process and execute NFT buying/selling transactions

b. Stimulus/Response Sequence

* + B-1: User action: Provide valid inputs for donating transaction form
  + B-2: System response: The system shall respond with transaction failed or successful message

c. Functional requirements

* + C-1: The system shall be able to process the NFT buying/selling inputs and ensure that the input is valid in terms of matching data fields, valid wallet address, valid amount, etc.
  + C-2: The system shall allow buyers to re-list the NFTs on the marketplace
  + C-3: If transaction succeed, the system shall transfer the NFT’s price amount directly to creators
  + C-4: If transaction succeed, the system shall reduce the NFT’s price amount from the buyer’s wallet
  + C-5: If transaction succeed, the system shall transfer the NFTs (i.e., ownership of the music digital copies) to from creators’ wallet to buyers’ wallet
  + C-6: If transaction succeed and the transaction is not the first transaction of the NFT, the system shall calculate a royalty fee based on the current amount and directly transfer the royalty fee to original creator

4.1.1.4 **Searching feature**

a. HIGH priority

* + A-1: System shall be able to allow users to search for other users and NFTs

b. Stimulus/Response Sequence

* + B-1: User action: Type in the input needed to look up and click search button
  + B-2: System response: The system shall respond with a list of result(s)

c. Functional requirements

* + System shall offer a text box for Searching component
  + System shall receive the input from users, process it and look up the search in the database
  + System shall return a list of result(s) if the input is valid
  + System shall return an empty list if the input is invalid/not found

**4.1.2 Users Feature**

**4.1.2.1 Creators features**

**4.1.2.1.1 Membership features**

a. MEDIUM priority

* + A-1: System shall offer
    - creators an ability to setup their own membership plans
    - fans an ability to register for membership plans

b. Stimulus/Response Sequence

* + B-1: User action:
    - Creators can configure their membership plans
    - Fans can pick the membership plans that they want
  + B-2: System response: The system shall add fans who register the membership plans to the correct community’s membership plans

c. Functional requirements

* + C-1: The system shall receive the membership metadata from creators, process them, and write them correctly to the database
  + C-2: The system shall receive the membership choices from fans, process theme, and add them to the community membership list
  + C-3: Once a user register for a membership plan, the user shall be able to cancel the membership right away if they wish but the user must not be able to get the refund

**4.1.2.1.2** **Digital** **Community (referred as community) features**

**4.1.2.1.2.1 Creating community**

a. LOW priority

* + A-1: System shall offer a digital community for artists to gather their fans

b. Stimulus/Response Sequence

* + B-1: User action:
    - Creators can create a community and its materials
    - Fans can interact with the community’s materials
  + B-2: System response: The system shall create a community under creators’ account

c. Functional requirements

* + C-1: The system shall let creators create one and only one digital community
  + C-2: The creators shall be able to configure their own community
  + C-3: The creators shall be able to attach their gallery page to the community
  + C-5: Fans can interact in community

**4.1.2.1.2.2 Creating community post**

a. LOW priority

* + A-1: System shall allow users to interact with community post

b. Stimulus/Response Sequence

* + B-1: User action:
    - Creators can create post with metadata
    - Fans can interact with post (i.e., comment, like, etc.)
  + B-2: System response: The system shall create community posts creators’ account and let fans interact with it

c. Functional requirements

* + C-1: Creators shall be able to create posts along with its metadata
  + C-2: Creators shall be able to add exclusive contents to community post
  + C-3: Fans shall be able to interact with posts
  + C-4: Fans with membership can interact with posts’ exclusive contents

**4.1.3 NFT Feature**

a. HIGH priority

b. Stimulus/Response Sequence

* + B-1: User action:
    - Creators can mint NFTs along with its metadata
    - Buyers can buy NFTs

c. Functional requirements

c.1 – NFT minting features

* + C-1-1: The system shall offer a form for creators to input metadata of the NFT
  + C-1-2: The NFT form must have a required field which allows creators to input their music audio files
  + C-1-3: The NFT form must have a required field which allows creators to input in a cover picture
  + C-1-4: The NFT form must have an option which allows creators to mint only 1 NFT or multiple NFTs
  + C-1-5: The NFT form must have a required field which allows creators to input in a name for the NFT
  + C-1-6: The NFT form must have an option which allows creators to choose if they want to mint NFT to showcase or for sale
  + C-1-7: The NFT form must have a required field which allows creators to input in a price for the NFT if it’s a for-sale-NFT
  + C-1-8: The NFT form must have a required field which allows creators to input in a royalty fee for the NFT if it’s a for-sale-NFT

c.2 NFT view

* + C-2-1: Fans can click donate button on NFT view page to start donating process
  + C-2-2: Buyers can click buy button on NFT view page to start buying process
  + C-2-3: System shall integrate a link to the smart contract of the NFT on Etherscan
  + C-2-4: System shall offer a link to share after an NFT is minted

**4.1.3 Fans Feature**

**4.1.3.1 Donating features**

a. HIGH priority

b. Stimulus/Response Sequence

* + B-1: User action: Click donate button to start donating process

c. Functional requirements

* + C-1: Fans shall be able to perform a one-time donate on the product
  + C-2: Fans shall be able to put in an amount that they wish to donate

**4.1.3.2 Membership registering features**

a. MEDIUM priority

b. Stimulus/Response Sequence

* + B-1: User action: Click membership plans button to start membership registering process

c. Functional requirements

* + C-1: Fans shall be able to reach to artists’ membership page
  + C-2: Fans shall be able to click on the wished membership plan to start membership registering process
  + C-3: Fans shall be able to accept or deny membership plans when the process starts
  + C-4: Fans shall be able to cancel the membership at any time
  + C-5: System shall add/remove the fans to the community memberships’ list depends on the membership status
  + C-6: System shall grant the permission to access community’s exclusive contents to membership users

**4.1.3.3 Community interacting features**

**4.1.3.3.1 Comment community posts as users**

a. LOW priority

b. Stimulus/Response Sequence

* + B-1: User action: Comment on community posts

c. Functional requirements

* + System shall have a text area box for fans to input in comments
  + Fans shall be able to click comment button to post the comments to the posts
  + Fans shall be able to click edit button to edit the comments
  + Fans shall be able to click delete button to delete the comments

**4.1.3.3.2 React to community posts as users**

a. LOW priority

b. Stimulus/Response Sequence

* + B-1: User action: React to community posts

c. Functional requirements

* + System shall have a list of emoji for fans to choose to react to posts
  + Fans shall be able to pick an emoji from the list
  + Fans shall be able to change their emoji to another emoji in the list
  + Fans shall be able to delete the reaction by click to the same emoji they already chose

**4.1.3.3.2 Share creators NFTs on other social media platforms**

a. HIGH priority

b. Stimulus/Response Sequence

* + B-1: User action: Copy share link from NFT

c. Functional requirements

* + Users shall be able to copy the share link in the NFT view page and share it on other social media platforms

## 4.2 Performance Requirements

*[See sections 4.0, 3.2 for specific directions about what outputs should be included here.]*

* The system shall be available and compatible with all modern webs browser
* The system shall be capable of supporting at least 10,000 users concurrently
* The system shall be able to handle multiple tasks (minting NFTs, listing NFTs, buying NFTs, setting up transaction reports, etc.) during a user session
* The system shall be able to make sure that all visible pages of the system respond in timely manner
* The system shall be able to store more than 100, 000 music NFTs (approximately 10mb/file)
* The system shall be available online for 24/7

## 4.3 Usability Requirements

*[See sections 4.0, 3.3 for specific directions about what outputs should be included here.]*

* The system shall conveniently and neatly prompt helpful information about all the abbreviations or technical terms used within the site
* The system shall have a succinct and transparent forms including descriptive content to guide users what shall be done while trying to submit any action
* The system shall have self-descriptive buttons to help users navigate through the site

## 4.4 Interface Requirements

*[See sections 4.0, 3.4 for specific directions about what outputs should be included here.]*

**4.4.1 social media (Community) interface**

- TODO: insert community mockup

**4.4.2 Registration interface**

- TODO: insert community mockup

**4.4.3 NFT registering interface**

- TODO: insert community mockup

**4.4.4 NFT buying interface**

- TODO: insert community mockup

**4.4.5 NFT marketplace interface**

- TODO: insert community mockup

**4.4.6 Membership setting interface**

- TODO: insert community mockup

**4.4.7 Membership registering interface**

- TODO: insert community mockup

**4.4.8 Profile interface**

- TODO: insert community mockup

**4.4.9 Profile setting interface**

- TODO: insert community mockup

**4.4.10 Searching interface**

- TODO: insert community mockup

**4.4.11 NFT history interface**

- TODO: insert community mockup

## 4.5 Logical Database Requirements

*[See sections 4.0, 3.5 for specific directions about what outputs should be included here.]*

* Two main databases:
  + On-chain data will be stored on a blockchain network
  + Off-chain data will be stored on a NoSQL database
* One helper storage
  + Audio files and cover image files are retained in NFT.storage & IPFS
* Types of information that will be used:
  + User data
  + Membership plans data
  + Community posts data
  + Community supporter lists data
  + NFTs’ metadata
  + Marketplace transactions data
* Frequency of use: High
* Accessibility: Always available
* Security:
  + Users’ information stays private and secured inside the database
  + Membership plans data is public to the platform users
  + Community posts’ information is public to the platform users
  + Community supporter lists’ information is public to the platform useters
  + NFTs’ metadata information maintains public and transparent on the blockchain
  + Marketplace transactions’ information stay public and transparent on the blockchain
* data retention
  + On-chain data (NFTs, marketplace transactions, supporter lists, etc.) will be retained firmly and immutably on blockchain network
  + Off-chain data (Users’ information, Community’s information, etc.) will be retained in a NoSQL database
  + Audio files and cover image files are retained in NFT.storage & IPFS

## 4.6 Design Constraints

*[See sections 4.0, 3.6 for specific directions about what outputs should be included here.]*

* The system smart contracts must be compatible with Ethereum Virtual Machine
* The system must be deployed to one of the Layer 2 blockchain network (Polygon)
* The system must not violate Customer and Privacy Act.
  + The system must ensure the user information is private and secured
  + The system must ensure to publish only information that is disclosed with the consent of the user
* The system must be completed within the Fall Semester of 2022
* Only users with crypto wallet can perform NFT-related actions
* TBD

## 4.7 Software System Attributes

*[See sections 4.0, 3.7 for specific directions about what outputs should be included here.]*

3.7.1 Reliability:

* The system performs correctly in case of failures. Self-detecting and self-healing in case of infrastructure problems, malicious attacks

3.7.3 Security:

* The system guarantees confidentiality, integrity, and protection against malicious attacks

3.7.4 Maintainability:

* The system is simple to operate and evolve over time without major code refactors

# 5. Appendix A – Tailoring Policies

### 5.1 Assumptions and dependencies

*[Identify any and all factors that may impact the implementation and execution of the requirements written below. These factors do not add a constraint but may impact development if they are changed. Example: a major update to an operating system(OS) on which the SUD is intended to run impacts the implementation of one of the core features. The version of the OS that the system had intended to run on should be listed in this section.]*

### 5.2 Acronyms and Abbreviations

|  |  |  |
| --- | --- | --- |
| Term | Definition | Abbreviation |
| Support Who You Love | The final version of the standalone web application of the system under development. | *SWYL* |
| Blockchain | a type of Digital Ledger Technology that consists of growing list of records, called blocks, that are securely linked together using cryptography. |  |
| Ethereum | a decentralized, open source blockchain with smart contract functionality | ETH/eth |
| Polygon | an Ethereum layer-2 protocol and framework for building interconnected blockchain ecosystems |  |
| Smart Contract | simply programs stored on a blockchain that run when predetermined conditions are met |  |
| Music non-fungible token | is a music digital asset that can be identified through its unique qualities held within its metadata | Music NFT |
| NFT minting page | A page available to creators allowing creators to fill in NFT metadata then mint it to the blockchain |  |
| Mint an NFT | System process the input metadata and create an NFT to the chosen blockchain |  |
| Donations | The number of crypto/money fans donate to artists |  |
| Crypto transactions | The transactions that are made by interacting with smart contracts (selling & buying NFTs or sending donations) |  |
| Creators | Musicians/artists who create music products and sell music NFTs |  |
| Buyers | Users who want to buy music NFTs |  |
| Supporters | Fans/supporters who simply just want to enjoy and/or donate rewards |  |
| Register/profile page | The page allows users to configure their personal database |  |
| Digital Community | A digital community acts as a social media where Creators and Supporters can hang out |  |
| Community Posts | Social media posts in community |  |
| NFT minting page | A page available to creators allowing creators to fill in NFT metadata then mint it to the blockchain |  |
| Marketplace page | A page available to anyone on the platform offers a marketplace where showcase all the NFTs and allows users to buy and sell NFTs |  |
| Membership page | A page to showcase membership plans |  |
| Membership configuration page | A page allows artists to manage their own membership plans |  |
| Searching function | A function allows users on the platform search to find other users or NFTs |  |
| NFT history transactions page | A page showcase a list of transaction of the NFTs |  |

### 5.3 Tailoring Policies

Tailoring is not a requirement to bring the document into compliance with the standards set by IEEE 29148-2018. Tailoring should only occur when conformance to the standard is not possible or practical. The act of tailoring is the modification and/or removal of one of the content sections outlined in this document, adding additional information items for organization is not considered tailoring. Tailoring should only occur when factors or circumstances:

* surround an organization that is using the document
* influence a project using this document to meet an agreement
* reflect the needs of an organization.

When tailoring the document, the following activities shall be implemented:

* Identify and document the circumstances that may influence tailoring.
  + novelty, size and complexity
  + stability of operating environments
  + variety in operating environments
  + starting date and duration
  + emerging technology
  + availability of services of enabling systems
  + other standards with which the document needs to conform.
* Identify and get input from all parties impacted by the tailoring process.
  + Such as stakeholders, contributors, and other interested parties
* Delete the information contents that require tailoring.

# 6. Appendix B – Analysis Models

# **6.1 Use Case Diagram**

# Diagram Description automatically generated

Figure 1.0: Use Case Diagram

**6.2 Activity Diagrams (AD)**

**6.2.1 Login AD**

Diagram

Description automatically generated

Figure 2.0: Login activity diagram

**6.2.2 Minting NFT AD**

Diagram

Description automatically generated

Figure 3.0: Minting NFT activity diagram

**6.2.3 Listing AD**

Diagram

Description automatically generated

Figure 4.0: Listing NFT activity diagram

**6.2.4 NFT Transactions AD**

Diagram

Description automatically generated

Figure 5.0: NFT transactions activity diagram

**6.2.5 Donation AD**

Diagram

Description automatically generated

Figure 6.0: Donation activity diagram

**6.2.6 Membership AD**

Diagram

Description automatically generated

Figure 7.1: Set up Membership activity diagram

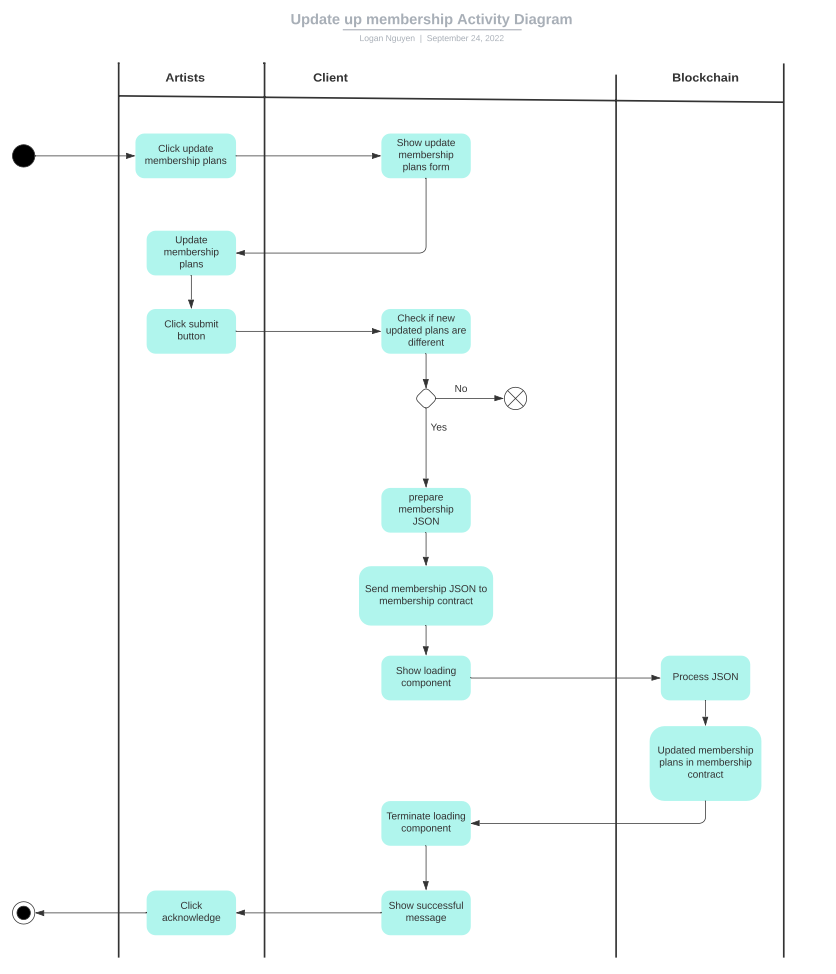


Figure 7.2: Update Membership activity diagram

Diagram

Description automatically generated

Figure 7.3: Register Membership activity diagram

Diagram, schematic

Description automatically generated

Figure 7.4: Update Membership plan activity diagram

Diagram, schematic

Description automatically generated

Figure 7.5: Cancel Membership activity diagram

**6.2.7 Community AD**

Diagram

Description automatically generated

Figure 8.1: Create post activity diagram

Diagram, schematic

Description automatically generated

Figure 8.2: Edit post activity diagram

Diagram

Description automatically generated

Figure 8.3: Delete post activity diagram

Diagram

Description automatically generated

Figure 8.4: Comment on post activity diagram

Diagram, schematic

Description automatically generated

Figure 8.5: Edit post’s comment activity diagram

Diagram

Description automatically generated

Figure 8.6: Delete comment activity diagram

Diagram

Description automatically generated

Figure 8.7: Like | Unlike post activity diagram

**6.3 System Architecture (SA)**

# 7. Appendix C – Copyright

This document is based on a template meeting the ISO/IEC/IEEE 29148-2018 standard, available at <https://www.iso.org/standard/72089.html>. Template authors are:

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