



Australian  
National  
University



# NFT2.0 - Immutable Qualification

Australian National University TechLauncher Audit 2

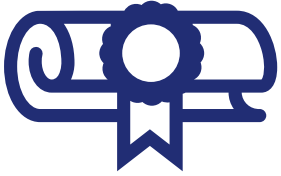
22-S2-2-C Immutable Team

# Content Segments

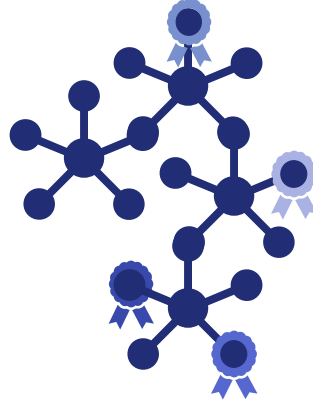
- Project Introduction
- Project Output
- Project Deliverable 1 Outline
- Evidence of Decision Making
- Current Value Delivered to Client
- Impact on next Deliverable
- Addressing Feedback from Audit 1



# Project Background:



Credentials



Immutable  
Qualification  
platform



Save time & money



# Project Value

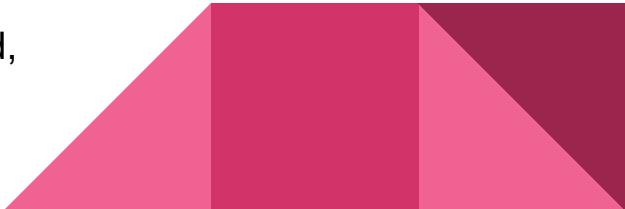
- Credentials are stored in a decentralized, secure, and tamper proof blockchain, rather than a centralized database
- Credentials stored in the user's wallet, which means the users own their credentials



# Project Stack

Front-end	React
Back-end	Node.js, Spring boot, and Solidity
Decentralized storage (Blockchain)	IPFS (InterPlanetary File System)
Testnet	Sepolia testnet
Off-line data storage	MySQL

The primary languages used are memory safe and regularly updated, which makes it easier to maintain and \*generally\* more secure.





# Project Introduction

# Design structure

User Layer

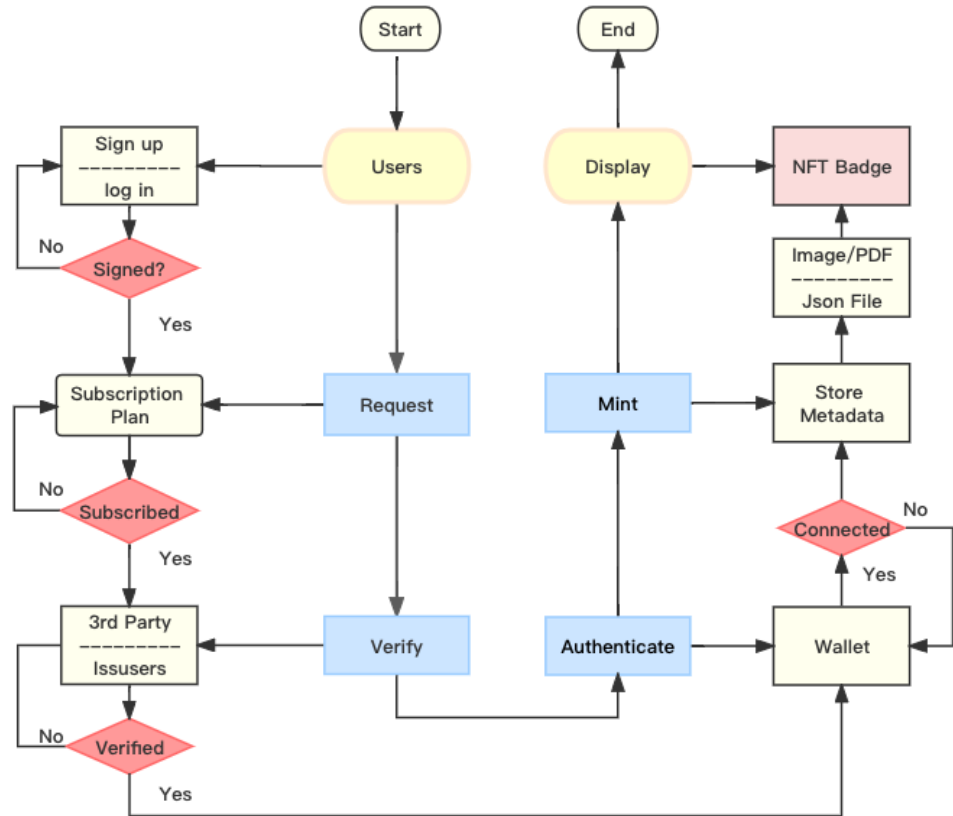
Request Layer

Verification Layer

Authentication Layer

Mint Layer

Display Layer





# User layer

## HOW IT WORKS

1

### CREATE A TRIAL ACCOUNT

Sign up to create an account, choose your best suitable subscription plan.

2

### VERIFY YOUR QUALIFICATIONS

Manually enter qualification data and submit an online form. Wait for verification results from the issuer.

3

### GET YOUR NFT

Connect crypto wallets. You'll create one easily if you don't have it yet. Receive NFT representing your qualification.

4

### DESIGN AND SHARE

Use our great badge designer. Share to promote yourself smartly and securely.

#### What is the Blockchain?

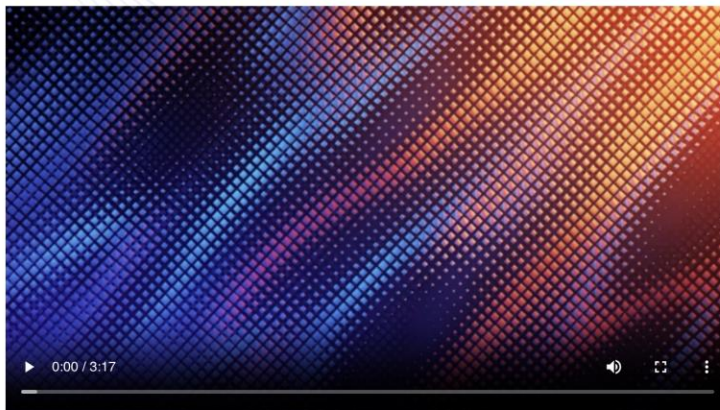
Immutable uses the Bitcoin Blockchain to create an unalterable record of credentials. The Blockchain is a secure digital ledger for economic transactions that can be programmed to document any valuable information, not limited to financial transactions. Any data written to the Blockchain is immutable and cannot be modified by any party in the future.

#### What is the NFT?

#### How Blockchain's Benefits Security?

## NFT2.0 - Immutable Qualification

Manage your verified credentials with  
NFT2.0,  
based on blockchain.

[Start free trial](#)[Learn more](#)

# Mint Cert



ADMIN BOARD  
USER

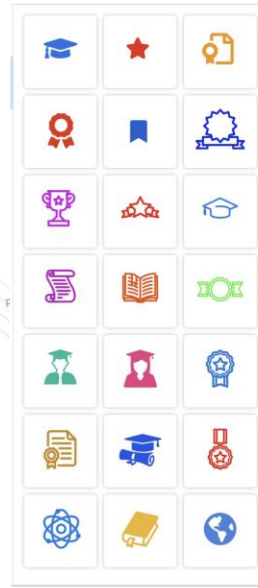
SUBSCRIPTION

NEW NFT

BADGE DESIGN

## Request List

ID	EDUCATIONTYPE	REQUESTTIME	QUALIFICATIONNAME	STATUS	ACTIONS
1	University	2023-08-08 12:10:02	Anu_certificate	Verified	<button>Mint</button>



ANU

Add Text



Powered by polotno.com

Complete design

78%

# Display your certificate



Lorem ipsum is placeholder text commonly used in the graphic, print, and publishing industries for previewing layouts and visual mockups.

#### Products

Web Studio  
DynamicBox Flex  
Programming Forms

#### Resources

Nostrud exercitation  
Visual mockups  
Nostrud exercitation  
Visual mockups  
Nostrud exercitation

#### Company

Consectetur adipiscing  
Labore et dolore  
Consectetur adipiscing  
Labore et dolore  
Consectetur adipiscing

# Subscription plan



ADMIN BOARD  
USER

SUBSCRIPTION

NEW NFT

BADGE DESIGN

Peter

LogOut

## Choose Your Subscription

### Free subscription

Free  
1 NFT limit

SUBSCRIPTION

### Plus subscription

\$9.99/month  
100 NFTs limit  
Faster certification speed  
Priority support service

SUBSCRIPTION

### Premium subscription

\$19.99/month  
1000 NFTs limit  
Faster certification speed  
Personalized customization service  
Advanced features  
Priority support service

SUBSCRIPTION



Lorem ipsum is placeholder text commonly used in the graphic, print, and publishing industries for previewing layouts and visual mockups.

#### Products

Web Studio  
DynamicBox Flex  
Programming Forms

#### Resources

Nostrud exercitation  
Visual mockups  
Nostrud exercitation  
Visual mockups  
Nostrud exercitation

#### Company

Consectetur adipiscing  
Labore et dolore  
Consectetur adipiscing  
Labore et dolore  
Consectetur adipiscing

# Request Layer



ADMIN BOARD  
USER

SUBSCRIPTION

NEW NFT

BADGE DESIGN

Peter

LogOut

## New NFT Request

### Qualification Data

Please enter the data you want to store in your qualification

#### Request Time

2023-08-31 17:44:39

#### Education Type

University

#### Holder Name

Peter Zhang

#### Name

Anu\_certificate

#### Description

Description



#### Authority Contact Email

zzt853080889@gmail.com

#### Cover Photo:

Choose file certificate.jpg



Request layer as it existed from previous semesters work

This section of the Immutable platform is being modified for deliverable 1 (more on that later)

# User/Admin interface (Request layer)



ADMIN BOARD  
USER

SUBSCRIPTION

NEW NFT

BADGE DESIGN

Peter

LogOut

## New NFT Request

### Qualification Data

Please enter the data you want to store in your qualification

### Request Time

2023-08-31 17:44:39

### Education Type

University

### Holder Name

Peter Zhang

### Name

Anu\_certificate

### Description

Description

### Authority Contact Email

zzt853080889@gmail.com

### Cover Photo:

Choose file | certificate.jpg



ADMIN BOARD  
USER

SUBSCRIPTION

NEW NFT

BADGE DESIGN

Peter

LogOut

## Admin Dashboard

BACK

ID	EDUCATION TYPE	HOLDER NAME	QUALIFICATION NAME	DESCRIPTION	REQUEST TIME	AUTHORITY CONTACT EMAIL	STATUS	ACTIONS
1	University	Peter	Anu_certificate	Graduation certificate	08/08/2023, 12:10:02	zzt853080889@gmail.com	Verified	

FILTER BY STATUS:

All



Lorem ipsum is placeholder text commonly used in the graphic, print, and publishing industries for previewing layouts and visual mockups.

### Products

Web Studio  
DynamicBox Flex  
Programming Forms

### Resources

Nostrud exercitation  
Visual mockups  
Nostrud exercitation  
Visual mockups  
Nostrud exercitation

### Company

Consectetur adipiscing  
Labore et dolore  
Consectetur adipiscing  
Labore et dolore  
Consectetur adipiscing

© Crulp.com. All rights reserved.



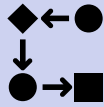
Deliverable 2 relates to these interfaces  
(more details later)

# Project Output

# Work Packages This Semester



**Microcredential  
Framework  
Compliance**



**Application  
Process Uplift**



**Decentralised  
Hosting**



**Project  
Maintenance**

**Project  
Maintenance**

**Additional UI/UX Bug Fixes  
Systems Architecture Document  
(SAD) Upkeep**

# National Microcredential Framework Compliance

- Update website NFT request page
- Compliance Check

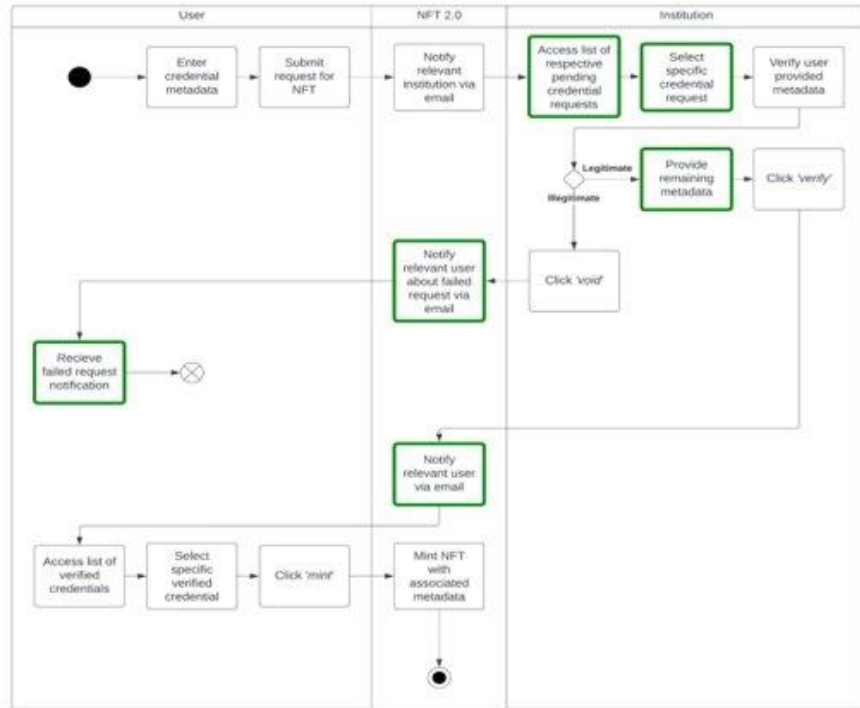
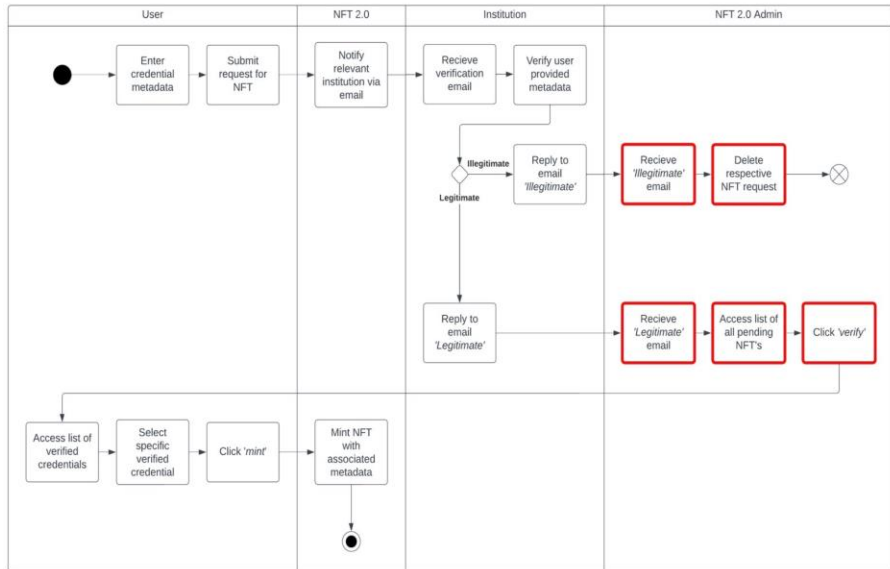
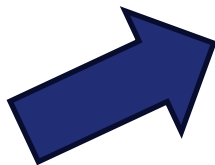


## Decentralised Hosting

- Complete a decentralised web hosting report
- Deploy NFT 2.0 to the Decentralised Platform



# Institution Verification Process Uplift



# Project Deliverable 1 Outline

# Deliverable 1/Milestone 3

- System Architecture Document
- Update the setup guide
- Setup of developing environment for this semester

## **Milestone 3: National Microcredential Framework Compliance**

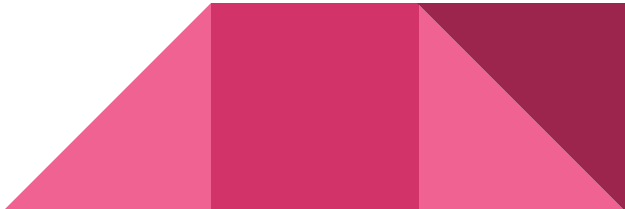
**Start Date: 11/03/2024**

**Due Date: 28/03/2024**

### **Goals:**

- Comprehension of the National Microcredential Framework.
- Update the website's NFT request page to include all necessary metadata as stated in the Framework.
- Conduct compliance checks with the Department of Education's Qualification Framework.

### **KPI:**

- Completion of a comprehensive review of the National Microcredential Framework.
  - Successful update of the website's NFT request page to include all necessary metadata.
  - Passing a compliance check with the Department of Education's Qualification Framework.
- 

# National Microcredential Framework

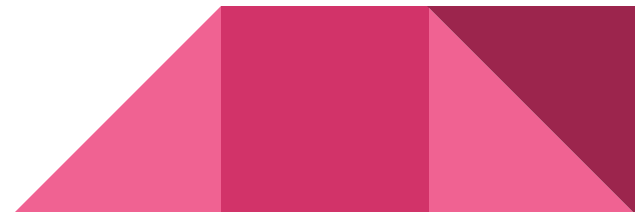


Australian Government  
Department of Education,  
Skills and Employment



## National Microcredentials Framework

November 2021



# All Necessary Metadata

Element	Status	Description
Title	Required	The title of the microcredential, described in plain English.
Provider	Required	The institution delivering the microcredential, and, if relevant, the company that developed the microcredential, i.e. XYZ Vendor microcredential being delivered by ABC University. A provider will also include partner providers, co-branding partnerships and industry endorers. A provider is any company or institution that provides a microcredential.
Content/Description	Required	A description of the structure of the microcredential and a summary of the content that will be taught, i.e. key topics.
Learning Outcomes	Required	The knowledge, skills or competencies a student will acquire upon completing a microcredential. Guidance on these learning outcomes is outlined in <b>Section 5.1</b> .
Language	Required	The language/s of instruction in which a microcredential will be taught in/ assessed. In an attempt to recognise interoperability and global citizenship, microcredentials may be offered in multiple languages.
Delivery Mode	Required	The method of delivery of a microcredential, e.g. onsite, online or a combination of both, and whether the microcredential requires synchronous engagement or is asynchronous. Where delivery is onsite, the location(s) will be stated.
Date of Delivery	Required	The set relevant delivery dates (start/ end) and an outline of the schedule within these dates, or whether a microcredential can be completed at a learner's own pace and commenced on any given date.
Learner Effort	Required	The commitment/ effort (volume of learning) required of learners. This estimate of hours should include: <ul style="list-style-type: none"> <li>i. Number of hours of in-person face-to-face contact with teaching staff.</li> <li>ii. Number of hours of synchronous online contact with teaching staff.</li> <li>iii. Number of hours of peer-to-peer engagement and its mode.</li> <li>iv. Estimated number of hours of asynchronous online content and reading/viewing of audiovisual material, etc.</li> <li>v. Estimated number of hours spent on assessment.</li> </ul>
Inherent Requirements	Required	The resource/s (if any) needed to undertake a specific microcredential, i.e. a laptop, specific software, textbooks etc.
Price and Financial Assistance	Required	The cost of a microcredential to learners, including any GST, discounts stipulated by providers, government funding and accepted payment mechanisms i.e. AfterPay, Paypal, and scholarships. The financial assistance for which a microcredential may qualify for.
Assessment	Required	The assessment element: the method and type of assessment (competency vs proficiency). Where assessment is onsite, the location/s will be stated.
Certification	Required	The proof of learning outcomes being met, i.e. certificate of completion. This proof of learning is issued upon completion of the microcredential.
Credit/ Other Recognition	Required	The type of recognition (credit towards award courses, credit towards vendor/ industry certifications, pathways or other recognition) that can be given upon completion of a microcredential.

# Finished Front End Modification

## New NFT Request

### Qualification Data

Please enter the data you want to store in your qualification

#### Title

brief description

#### Provider

provided name

#### Date of Delivery

DD-MM-YYYY

#### Description

key content that will be taught

#### Language

language

#### Learning Outcome

The knowledge, skills or competencies a student will acquire upon completing a

### Learner Effort

input hours, i. Number of hours of in-person face-to-face contact with teaching staff. ii.

### Inherent Requirements

The resource/s (if any) needed to undertake a s

### Assessment

list, competency vs proficiency, onsite or off site, input location if onsite

### Certification

选择文件 未选择任何文件

### Credit/Other Recognition

选择文件 未选择任何文件

### Quality Assurance

input statement of quality assurance processes applied to the microcredential

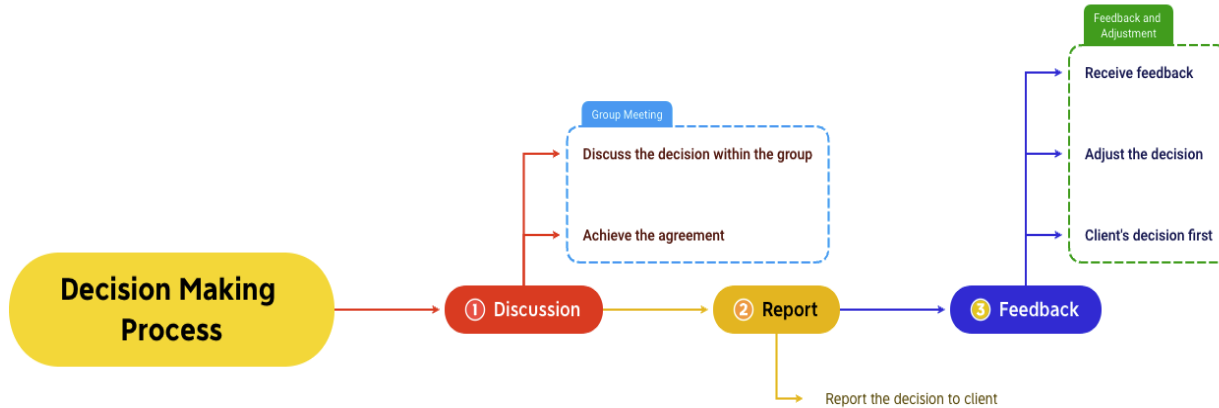
### Price and Financial Assistance

payment methods

Submit

# Evidence of Decision Making

# Decision Making Overview



Decision-Making time

Risk	Impact	Time	Report to Client
High	High	3-7 working days	Yes
High	Low	3-7 working days	Yes
Low	Low	1-2 hours	No
Low	High	3-7 working days	Yes

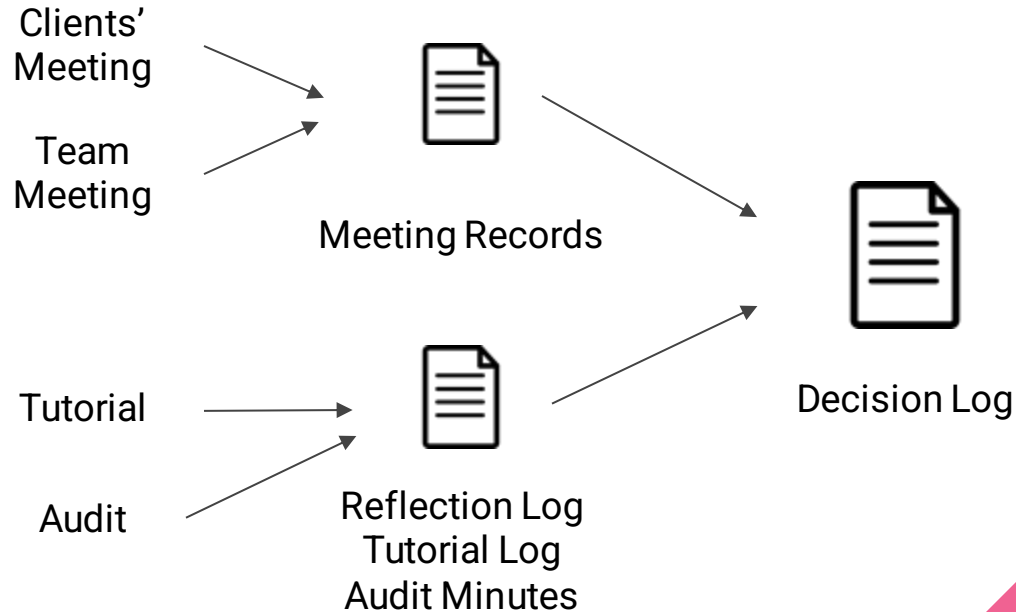




## Navigation

1. Landing Page -> Decision Making -> Decision Log

# Decision Source (Prior to week 5)



## Navigation

1. Landing Page -> Stakeholder Engagement -> Client Meeting

# Decision Log in Meeting Minutes (Going Forward)

## Decision Log

1. After talking with our clients, as well as the team, we opted to continue with client meetings in-person, rather than online over teams
  - a. In-person client meetings will occur in either in the Hive, Hancock library, or Chifley library
2. Opted to include instructions in our landing page to further elaborate what each of the links contain
3. The team has now been split into frontend and backend teams which can work independently (can work on different deliverables at the same time)
  - a. Each project lead is responsible for managing the github issues related to the tasks they need to complete

### Action items

### Owner(s)

### Deadline

### Status

Decompose NMF

All Members

20/03/2024

Complete

Example image from week 5 client meeting minutes

**Legacy Decision Log still exists for now**

# Reflection Log in Meeting Minutes (Going Forward)

## Feedback

1. Extended elevator pitch should mention the software stack being used and the compliance checks that the platform follows.
2. Our tutor mentioned that the issues page was very sparse, and that the issues which currently exist look more like responses to epics rather than issues.
3. Our tutor also recommended that each commit (going forward) should mention the issue which the commit is working on.
4. Our tutor recommended that we merge our decision log into our team, client, and tutorial meeting minutes.

Example image from week 5 tutorial meeting minutes

**Legacy Reflection Log still exists for now**

# Meeting Minutes (Team, Client, and Tutorial)

 Name ▾



Week 1 Meeting Minutes.docx



Week 2 Meeting Minutes.docx




Week 3 Meeting Minutes.docx



Week 4 Meeting Minutes.docx



 Week 5 Meeting Minutes.docx

## Navigation

Landing Page -> Teamwork -> Team Meeting

Landing Page -> Stakeholder Engagement -> Client Meeting

Landing Page -> Stakeholder Engagement -> Tutorial Log

# GitHub Issues

**Immutable-2024s1** Add status update

Task List | RoadMap | **Status Board** | Individual Work Log | Acceptance Criteria Ch | + New view

Filter by keyword or by field Discard

### No Status 20

- Immutable2024s1ANUTechlauncher #150  
B.2.1.2 Implement Frontend Element: Provider
- Immutable2024s1ANUTechlauncher #151  
B.2.1.3 Implement Frontend Element: Date of Delivery
- Immutable2024s1ANUTechlauncher #152  
B.2.1.4 Implement Frontend Element: Content / Description
- Immutable2024s1ANUTechlauncher #153  
B.2.1.5 Implement Frontend Element: Language
- Immutable2024s1ANUTechlauncher

+ Add item

### Todo 5

This item hasn't been started

- Immutable2024s1ANUTechlauncher #144  
B.3 Conduct Compliance Check with the Department of Education's Qualification Framework
- Immutable2024s1ANUTechlauncher #138  
Institution Verification Process Uplift
- Immutable2024s1ANUTechlauncher #139  
Decentralized Hosting Research and Launch
- Immutable2024s1ANUTechlauncher #140  
Immutable MVP v3.0 Release

+ Add item

### In Progress 4

This is actively being worked on

- Immutable2024s1ANUTechlauncher #135  
24-s1
- Immutable2024s1ANUTechlauncher #137  
B. National Microcredential Framework Compliance
- Immutable2024s1ANUTechlauncher #143  
B.2.1 Update Frontend with Required Metadata for NFT Request Page
- Immutable2024s1ANUTechlauncher #145  
B.2.2 Update Backend to Support Metadata Requirements for NFT Request Page

+ Add item

### Done 4

This has been completed

- Immutable2024s1ANUTechlauncher #134  
A. Initiate the Project Repo/Onboarding - 24s1
- Immutable2024s1ANUTechlauncher #142  
B.1.1 Comprehension of the National Microcredential Framework
- Immutable2024s1ANUTechlauncher #147  
B.2.1.1 Update frontend form with unique input elements
- Immutable2024s1ANUTechlauncher #149  
B.2.1.1 Implement Frontend Element: Title

+ Add item

# Road Map

37	✓ A. Initiate the Project Repo/Onboarding ...	#134			
38	🕒 B. National Microcredential Framework C...	#137	🕒 B. National Microcredential Framework Compliance #137		
39	✓ B.1.1 Comprehension of the National Mi...	#142	✓ B.1.1 Comprehension of the National Microcredential Framework #142		
40	🕒 B.2.1 Update Frontend with Required Me...	#143	🕒 B.2.1 Update Frontend with Required Metadata for NFT Request Page #143		
41	🕒 B.2.2 Update Backend to Support Metad...	#145	🕒 B.2.2 Update Backend to Support Metadata Requirements for NFT Request Page #145		
42	🕒 B.3 Conduct Compliance Check with the ...	#144	🕒 B.3 Conduct Compliance Check with the Departm		
43	🕒 Institution Verification Process Uplift	#138			🕒 Ins
44	🕒 Decentralized Hosting Research and Lau...	#139			



Current Value  
Delivered

# Update the NFT Request Page



## Back-end

On-going...

- Update the *OrderRequest* Model
- Database Adjustments
- Ensure Data Consistency
- Modify API



## Front-end

1. Modified *OrderRequest.jsx*, including context holders and "POST" to back end.
2. Modified part of *Modal.jsx*
3. Modified part of *InfoPage.jsx*
4. Wrote some TODO in the above files, some metadata/parameter setting still need to modify later

The updated  
Request Page



## New NFT Request

### Qualification Data

Please enter the data you want to store in your qualification

#### Title

#### Provider

#### Date of Delivery

#### Description

#### Language

#### Learning Outcome

#### Learner Effort

#### Inherent Requirements

#### Assessment

#### Certification

 No file chosen

#### Credit/Other Recognition

 No file chosen

#### Quality Assurance

#### Price and Financial Assistance

newly  
added



# Value Delivered of our On-going back-end work

## OrderRequest Model Update

### **Objective:**

To align the data model with front-end enhancements and emerging business requirements.

### **Value Delivered:**

Ensures that our application can handle complex order processing scenarios, enhancing adaptability.

## Database Adjustments

### **Objective:**

To optimize database schema and relationships for performance and scalability.

### **Value Delivered:**

Reduces query times and improves the reliability of data storage, directly impacting user satisfaction.

## Ensuring Data Consistency

### **Objective:**

To implement mechanisms that guarantee data integrity across all user interactions.

### **Value Delivered:**

Increases user trust through accurate and reliable data presentation, minimizing errors.

## API Modifications

### **Objective:**

To refine our API endpoints for better performance and security.

### **Value Delivered:**

Facilitates seamless integration and communication between the front-end and back-end, offering a smoother user experience.



# Setup Guide

Navigation  
Github Repo -> SETUP\_GUIDE.md

After all the steps above, when UserLayerApplication run, it should like:

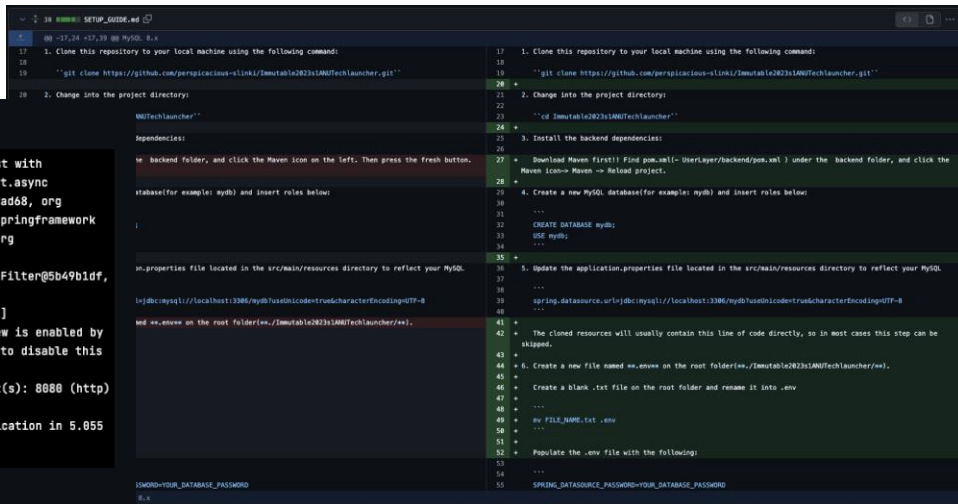
```
2024-03-21 02:35:31.813 INFO 75549 --- [main] o.s.s.web.DefaultSecurityFilterChain : Will secure any request with
[org.springframework.security.web.session.DisableEncodeUrlFilter@54cce508, org.springframework.security.web.context.request.async
.WebAsyncManagerIntegrationFilter@755833c5, org.springframework.security.web.context.SecurityContextPersistenceFilter@1399ad68, org
.springframework.security.web.header.HeaderWriterFilter@0ef2686, org.springframework.web.filter.CorsFilter@229c4d34, org.springframework
.security.web.authentication.logout.LogoutFilter@395115ac, com.usellayer.function.security.jwt.AuthTokenFilter@17ebbf1e, org
.springframework.security.web.savedrequest.RequestCacheAwareFilter@47d44668a, org.springframework.security.web.servletapi
.SecurityContextHolderAwareRequestFilter@68658389, org.springframework.security.web.authentication.AnonymousAuthenticationFilter@5b49b1df,
org.springframework.security.web.session.SessionManagementFilter@55578ee6d, org.springframework.security.web.access
.ExceptionTranslationFilter@62878d7c, org.springframework.security.web.access.intercept.FilterSecurityInterceptor@217089bd]
2024-03-21 02:35:31.844 WARN 75549 --- [main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by
default. Therefore, database queries may be performed during view rendering. Explicitly configure spring.jpa.open-in-view to disable this
warning
2024-03-21 02:35:32.276 INFO 75549 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8888 (http)
with context path ''
2024-03-21 02:35:32.286 INFO 75549 --- [main] c.u.function.UserLayerApplication : Started UserLayerApplication in 5.055
seconds (JVM running for 5.911)
```

8. Install the frontend dependencies and start the frontend development server:

```
cd frontend
npm install
npm create vite@latest
npm run dev
```

VITE v4.1.1 ready in 1713 ms

```
➔ Local: http://localhost:5173/
➔ Network: http://192.168.1.101:5173/
➔ press h to show help
```





Next Deliverable

# Next Deliverable: Application Process Uplift

## Verification layer

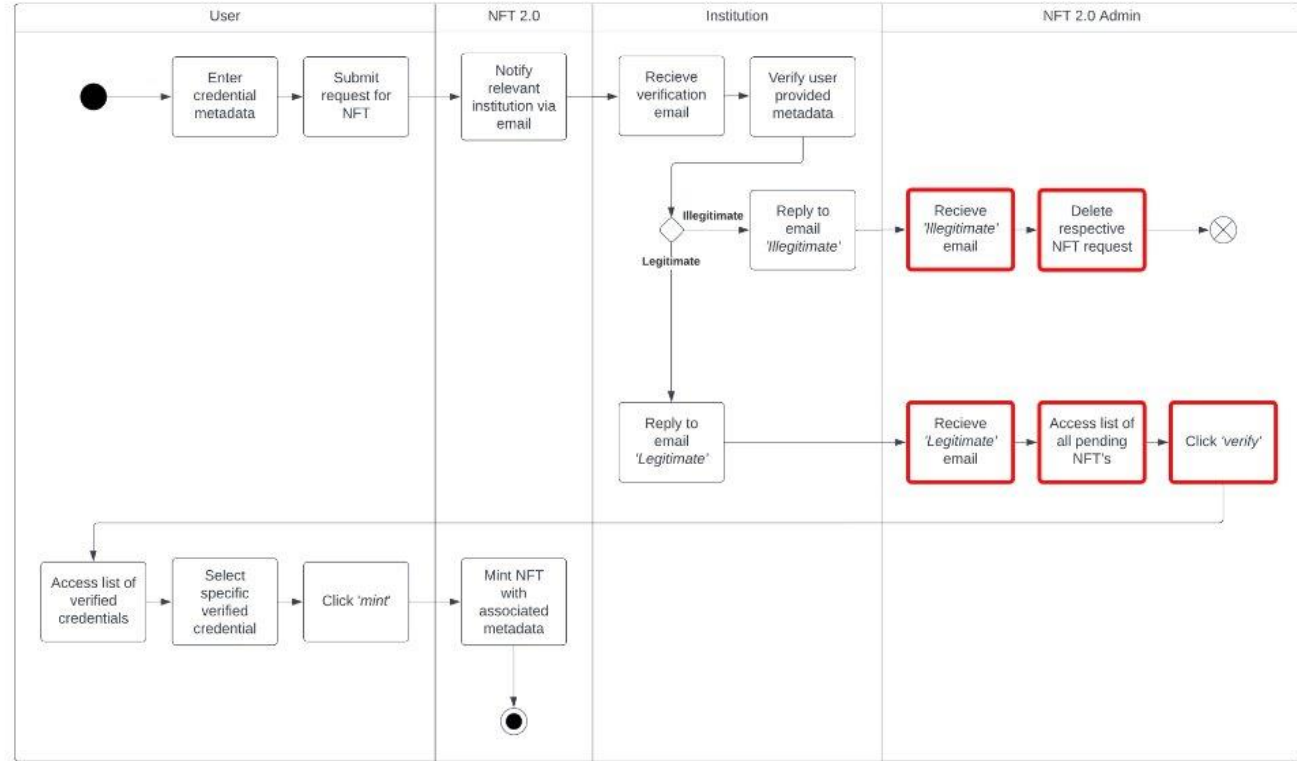
Contacts institutions to provide NFT 2.0 administration with approval of user's request.

## Application Process Uplift

enable the application to automatically send, receive and approve institutions response to user's verification requests.

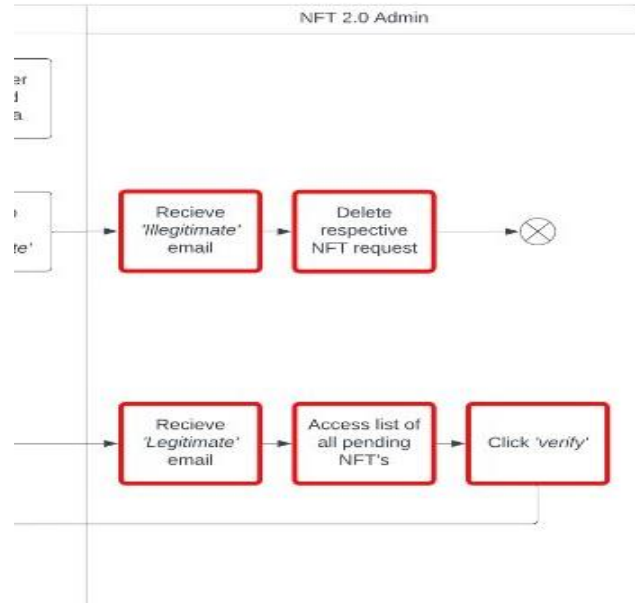


# Application Process Uplift

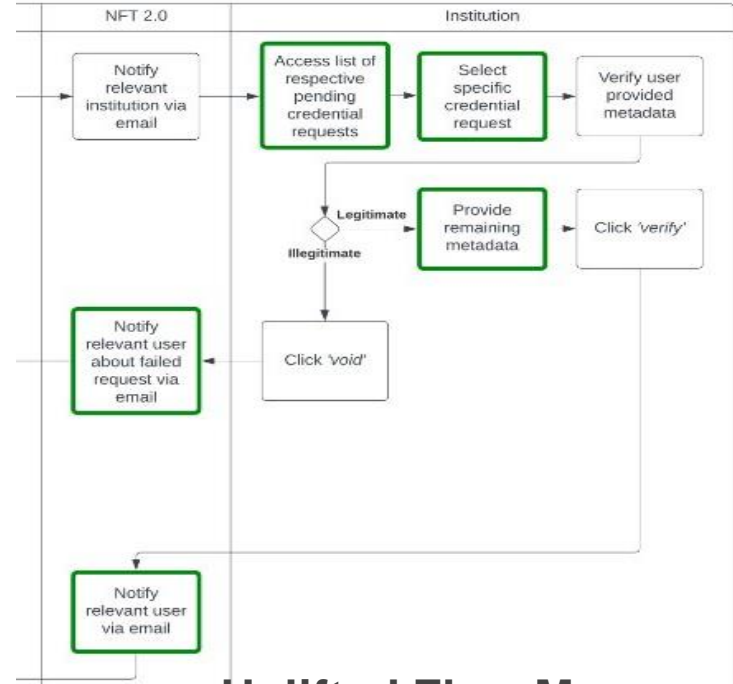


Current Flow Map

# Application Process Uplift



Original Flow Map



Uplifted Flow Map

# Reflection

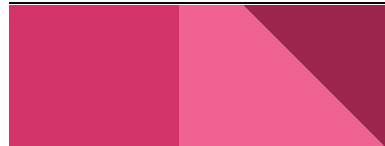
# Feedback from audit 1

- Changes to the landing page
- Use the GitHub Issues board for team members' contributions
- Improve communication with stakeholders, and ensure material accessibility.
- Changes to meeting minutes, add decisions section

The decision making log is well put together but doesn't seem to cover what I see as the important decisions the team has made so far. There is a better way than a decision log. Use a "Decisions" section in your meeting minutes or full-page documents for real big decision discussions (see Atlassian decision templates). It is difficult to take decision log artifacts seriously if they don't cover all options. Don't waste precious space on artifacts.

As communicated by email, despite being as clear as possible last week I as an assessor I did not have access to your materials. It was necessary for me to follow up repeatedly to get this access. I still am not confident that I have access to all of the team's materials. Always try to be 1 step ahead of your stakeholders and be thinking about what they will need.

The team has produced a range of artifacts. Per the email sent to the team it's hard to be clear about what is from this semester and what is from last semester. Make a **real** scrum/kanban board that every team member is proactively using and contributing to. Such a thing could be an "ultimate" source of truth and save a lot of effort on other pages.





# Overview for our reflection log

The team has produced a range of artifacts. Per the email sent to the team it's hard to be clear about what is from this semester and what is from last semester.	Make a real scrum/kanban board that every team member is proactively using and contributing to. Such a thing could be an "ultimate" source of truth and save a lot of effort on other paperwork and admin.	Tutor	completed
The decision making log is well put together but doesn't seem to cover what I see as the important decisions the team has made so far. There is a better way than a decision log. Use a "Decisions" section in your meeting minutes or full-page documents for real big decision discussions (see Atlassian decision templates).	Adding decision section into meeting minutes.	Tutor	ongoing
The decision making log is well put together but doesn't seem to cover what I see as the important decisions the team has made so far. There is a better way than a decision log. Use a "Decisions" section in your meeting minutes or full-page documents for real big decision discussions (see Atlassian decision templates). It is difficult to take decision log artifacts seriously if they don't outline, compare and assess multiple options. Don't waste precious resources putting together token artifacts.	Discussing whether change the form of decision log	Tutor	ongoing
Microsoft planner was slow to adopt due to technical issues, audit 1 possibly would have been easier to complete	Contact Client (MS Planner) to make new board	Self	Completed

# Questions & Answers

