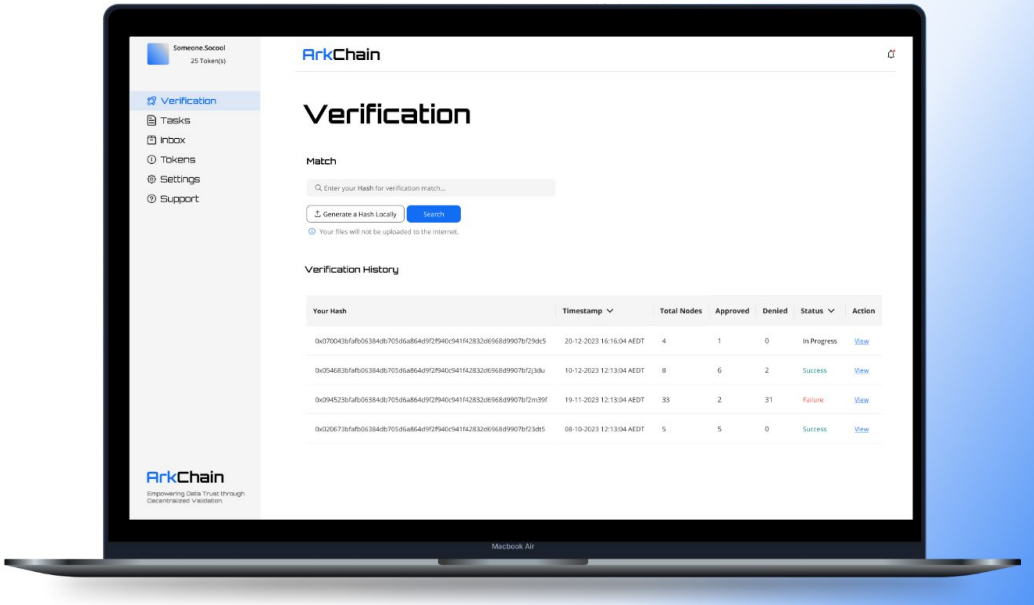
ArkChain

Challenge 2: Data Consensus, Verification, Authenticity & Validation

Harry Sackman
Alfred Haochen Zhang
Lucas Le Chen
Noel Kim
Rezwanul Mustafa



Our Team

What is ArkChain?

- A project which aims to empower the trust of data through decentralised validation.

ArkChain Team Roles:

- Harry Sackman
  - Project Manager
- Alfred Haochen Zhang
  - UX Designer
- Lucas Le Chen
  - Consensus Engineer
- Noel Kim
  - Data Engineer
- Rezwanul Mustafa
  - Infrastructure Engineer

The BIG Question

Too much “trust me bro?”

In comes ArkChain

Problem Statement

I'am Rick

I want my data to be verified without sharing it everywhere.

Rick, 24, Data Analyst

BIO

Rick works for a global consulting firm and manages a diverse array of documents and data from various origins. He envisions that a decentralized platform could provide him with verification capabilities without the need to share or compromise the integrity of the information elsewhere.

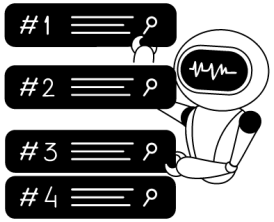
FRUSTRATIONS

1. Rick is determined to prevent the leakage of sensitive data to third parties.
2. Rick only want to share the data with trusted collaborators.

MOTIVATIONS

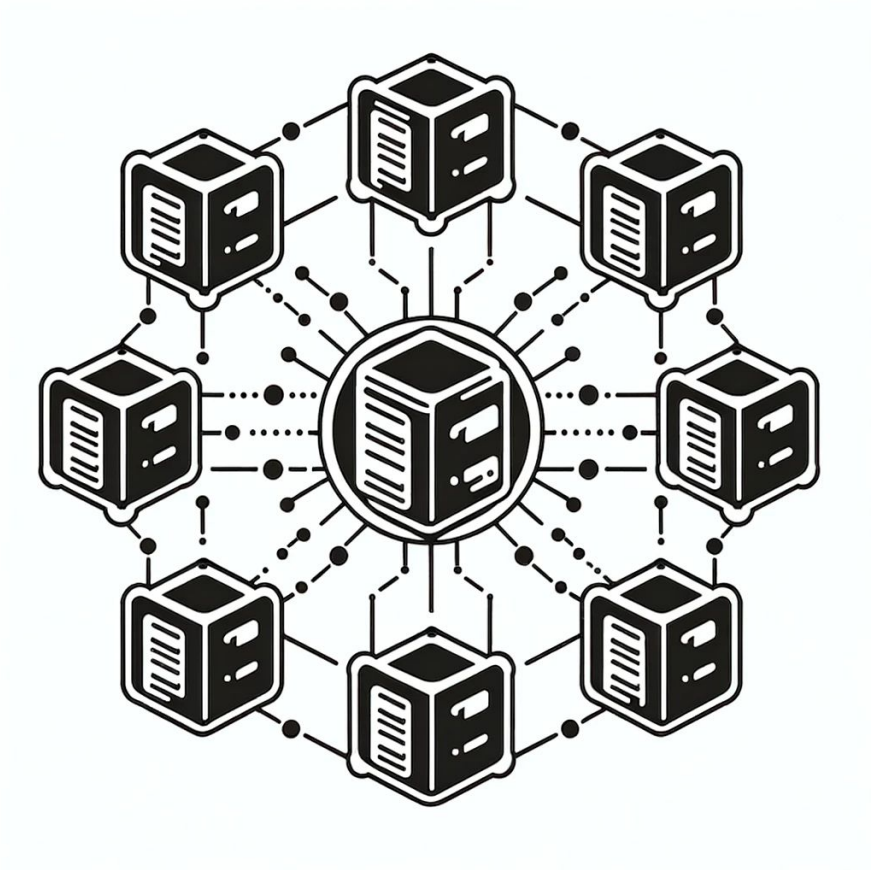
1. Rick expects an open-sourced decentralised platform for peer-to-peer verifications.
2. Rick can select trusted verifiers, ensuring that his data is safeguarded and minimizing the risk of potential misuse.

Which data to share?



Whom to share with?

Solution Overview



ArkChain

- **Peer-to-Peer Network:**

  Revolutionizing data handling and verification.

- **Unique Platform:**

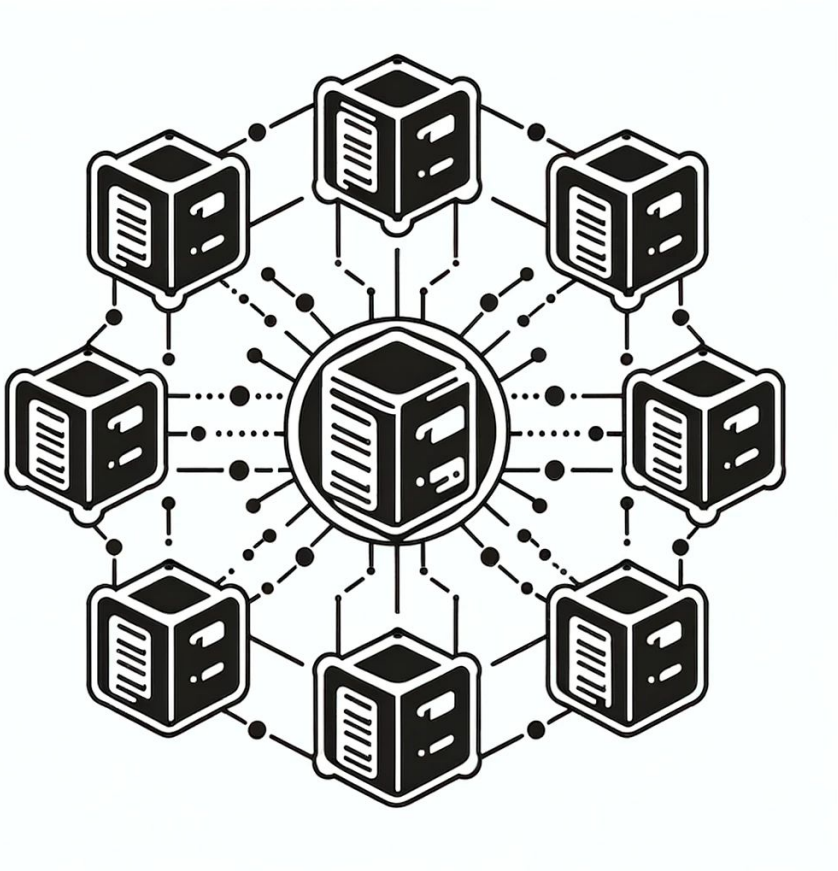
  Sharing and verifying metadata among nodes.

- **Data Integrity:**

  Every data type authenticated and validated through a distributed ledger.

  Ensures integrity and trustworthiness of all data.

Solution Overview



ArkChain

- **Completely Decentralized:**

  Managed collectively by users, not a central authority.

- **Collaborative Environment:**

  Fosters security and user collaboration.

- **Arkchain Consensus Protocol:**

  Core technology powering Arkchain.

- **Trust Autonomy, Robustness:**

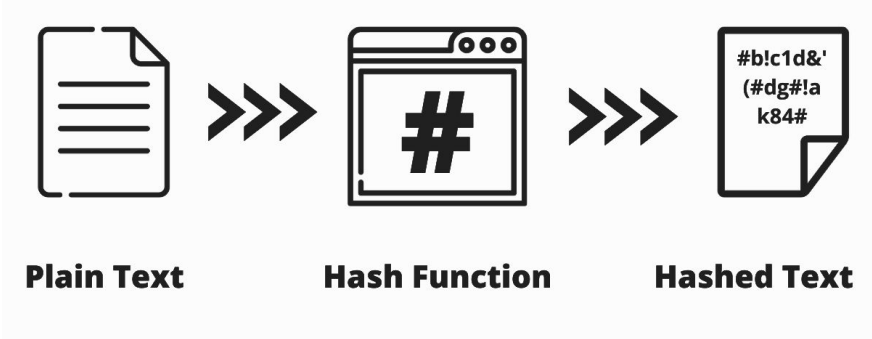
  Each node decides its trusted connections, Resilient against centralized failures.

Technical Breakdown

Key Technologies

- RSA Cryptography
- SHA-256 Hashing Algorithm
- Graph
- Data Tree
- Federated Byzantine Consensus

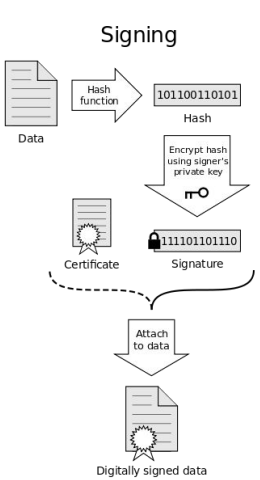
Hash Algorithm

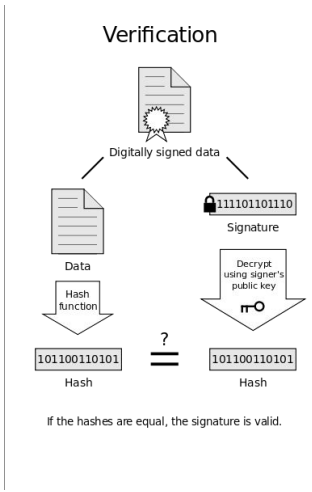


Infrastructure Approach

ArkChain is a decentralized infrastructure for key-sharing and hash-based data integrity.

No data is shared through arkchain, only the metadata required to verify.



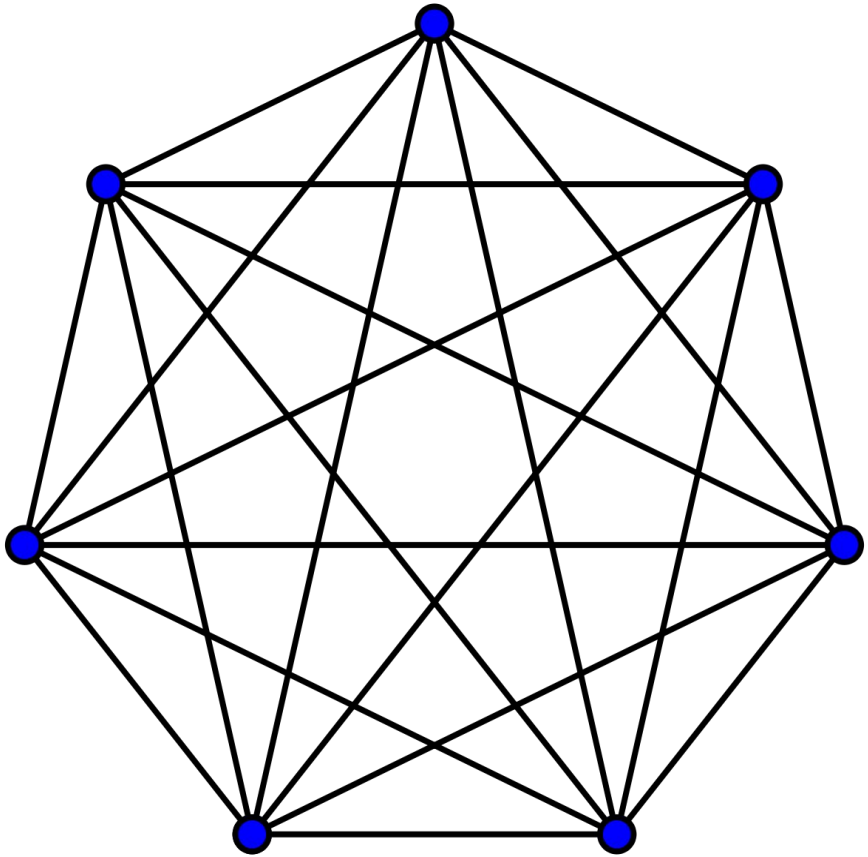


Architecture - Users

- **All users are directly connected to each other**

  Complete connected graph.

- **Allows broadcasting among peers to verify and validate data.**
- **Users can store ArkBlocks**



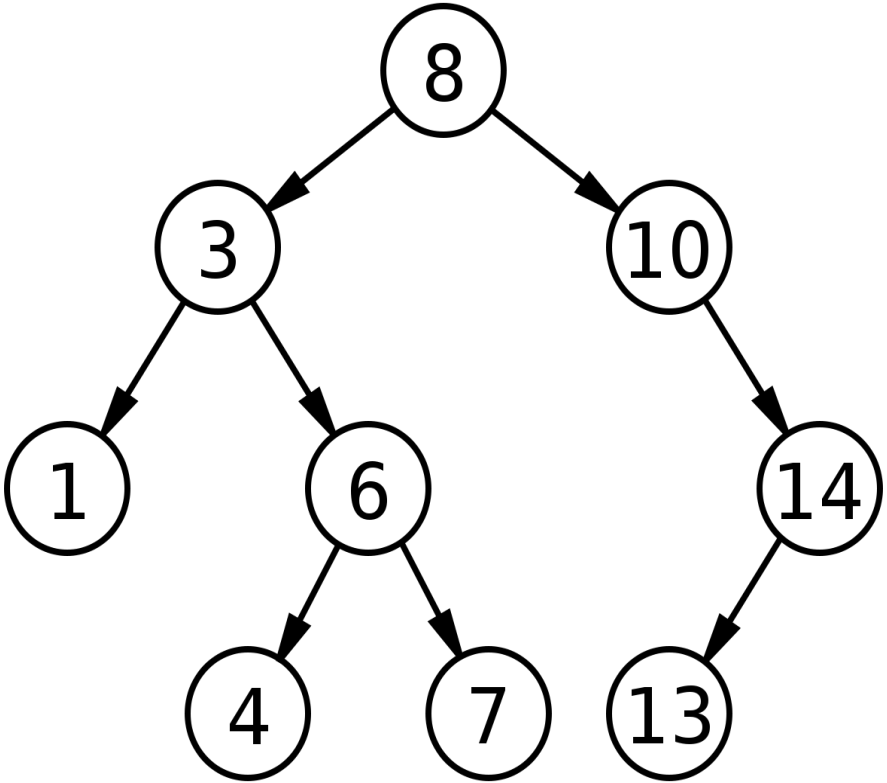
Architecture - Data

- **ArkBlocks are stored in a Data Tree.**

  Balanced binary tree.

- **Every user has their own Data Tree.**

  User's local copy of the ArkBlock.



Visual Showcase

DESIGN SYSTEM- FONT

Hero Title Orbitron Bold 28

Title Orbitron Bold 28

Subtitle Orbitron Semibold 16

Bodytext title Open Sans SemiBold 12

Body text Open Sans Regular 12

Subtext Open Sans Regular 12

DESIGN SYSTEM- COMPONENT

Typing and Searching Bar

SELECTED

UNSELECTED

Secondary Button | Primary Button

indication and information

CONTAINER

DATA

RED

GREEN

NAVIGATING

DESIGN SYSTEM- COLOUR PALETTE

F5F5F5

146EF5

FA3E3E

048785

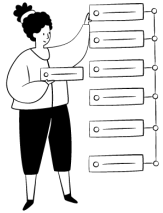
DESIGN SYSTEM- LOGO

ArkChain

ArkChain

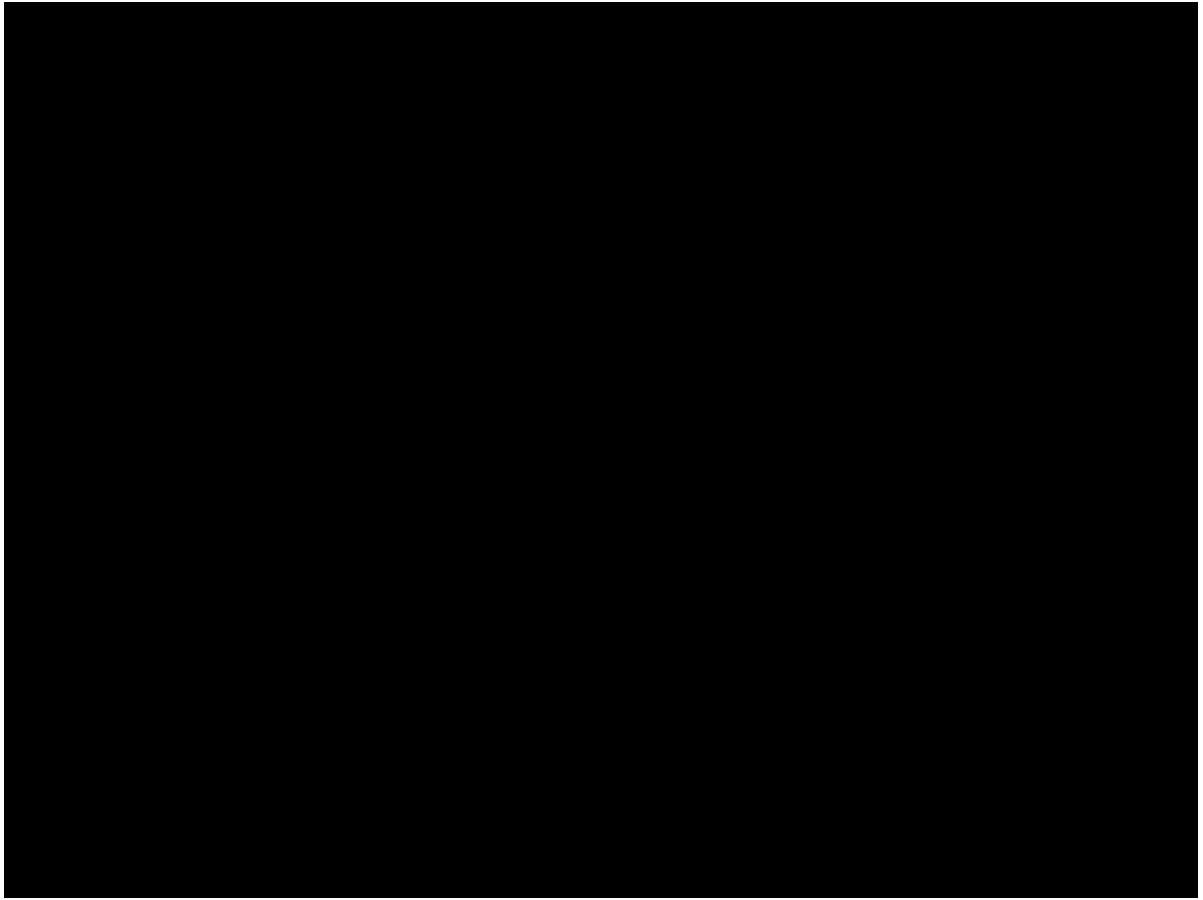
Visual Showcase

Enter the hash of your data or generate one locally using our platform.



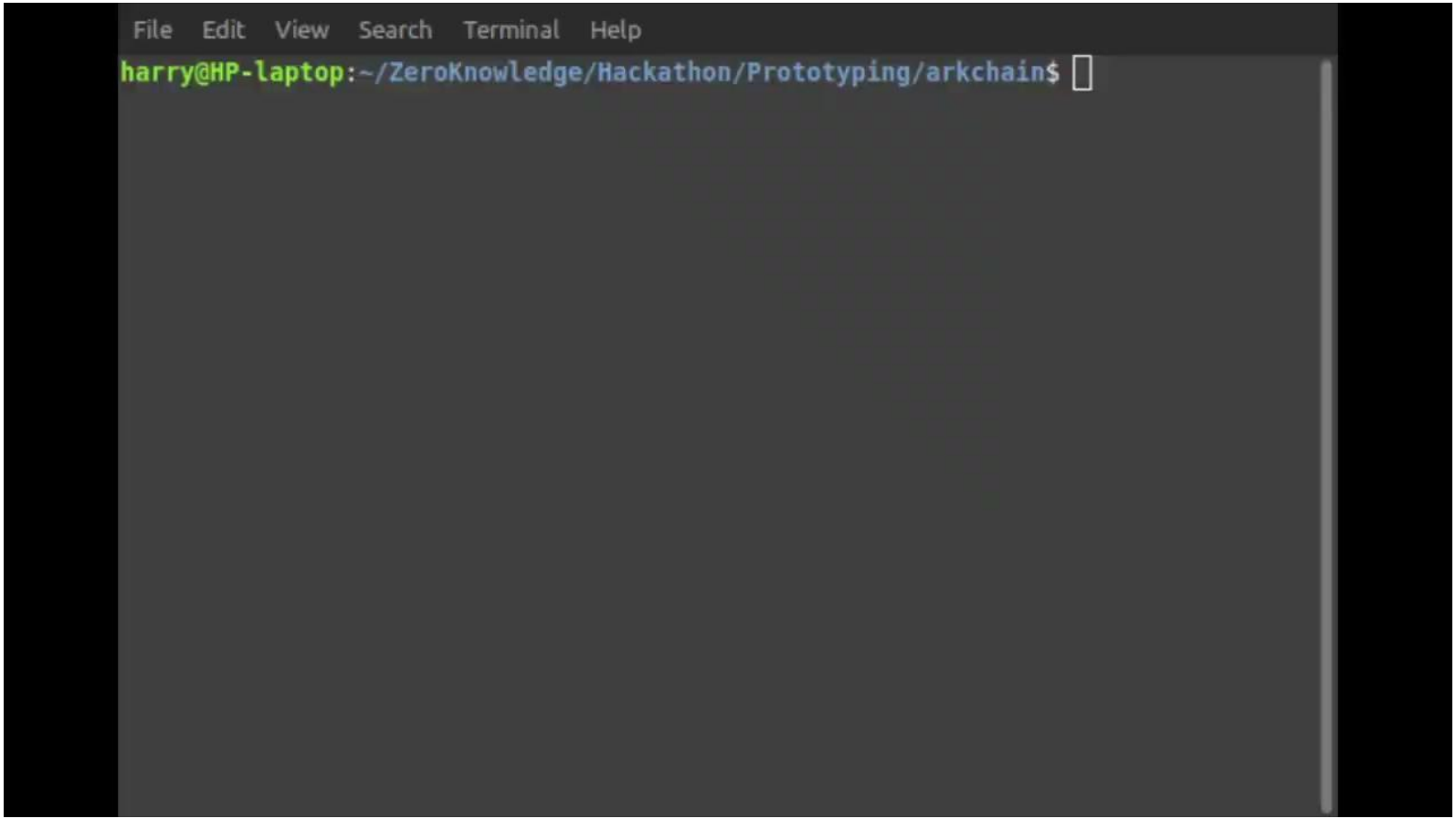
Select a list of the trusted verifiers (nodes) to verify your data or Invite your verifiers.

Check the verification process in “Tasks”. Send it to certain party or download the report.



Prototype Demonstration

```
node1.verify("/sample_images/pikachu.png", user_graph)
node2.verify("/sample_images/charizard.png", user_graph)
node3.verify("/sample_images/psyduck.png", user_graph)
```



What's next for ArkChain: Future plans

Idea 1

Multi-signatures could be implemented to indicate agreement via consensus algorithm on the correct data hash and source.

Idea 2

Oracle nodes that collect 'verification record' (hash / oracle signature) metadata about web content to mitigate man in the middle attacks.

Thank you!

Any Questions?

Real-world Potential Use-case

- Open data that has multiple sources.
- ArkChain could also help against misinformation by AI.

Название фирмы	Улица	Дом	Индекс	Район	Дата создания	Телефон	E-mail	Сайт	Время работы
2ГИС, городской информационный сервис	Северо-Западная	'2'	656037	Октябрьский	19.11.2004 12:40	9831067549 9831753158	inf@barnaul.2gis.ru	www.2gis.ru	08:30 до 17:30
Эко-Терем, ООО, строительная компания	Новороссийская	'140'	656064	Железнодорожный	14.12.2004 13:37	9628103334	eco-terem@mail.ru	ecoterem-altai.ru	08:30 до 17:30
Центр развития ребенка-детский сад №11	Короленко	'26'	656056	Центральный	14.12.2004 14:03	652417	aleksandra.borodina2012@yandex.ru	детсад11-барнаул.рф	08:30 до 17:30
Здоровячок, детский сад №12	Сизова	'22'	656002	Октябрьский	14.12.2004 14:09	611169	12dslora@mail.ru|1detsad12@mail.ru	12-детсад.рф	08:30 до 17:30
Здоровячок, детский сад №12	Гулькина	'29'	656002	Октябрьский	14.12.2004 14:09	616757	12dslora@mail.ru|1detsad12@mail.ru	12-детсад.рф	08:30 до 17:30
Кораблик, центр развития ребенка-детский сад №16	9 Мая	'3'	656002	Октябрьский	14.12.2004 14:13	617213	detsad16metod@mail.ru	dsad16.ru	08:30 до 17:30
Детский сад №21	Аванесова	'42'	656003	Центральный	14.12.2004 14:20	683247	det_sad21@mail.ru	детсад-21.рф	08:30 до 17:30
Детский сад №22 компенсирующего вида	Советская	'18'	656002	Октябрьский	14.12.2004 14:24	244526	detskiisad22@mail.ru		08:30 до 17:30
Детский сад №30 компенсирующего вида	Ядринцева переулок	'61'	656008	Центральный	14.12.2004 14:30	617793	ir.griaznova@yandex.ru	ds30.my1.ru	08:30 до 17:30

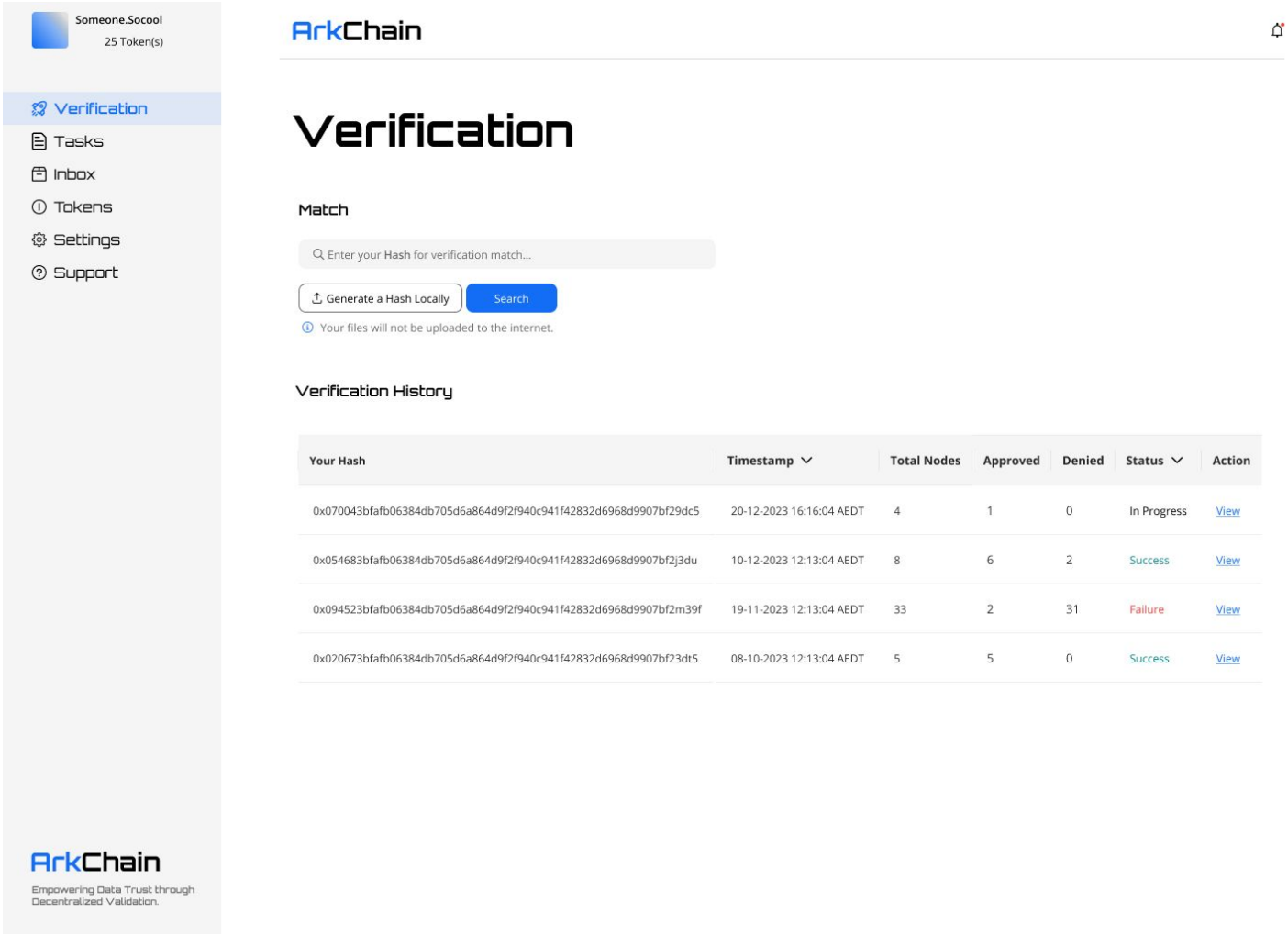
SMART Project Goal

S	M	A	R	T
Specific	Measurable	Achievable	Relevant	Time-Bound

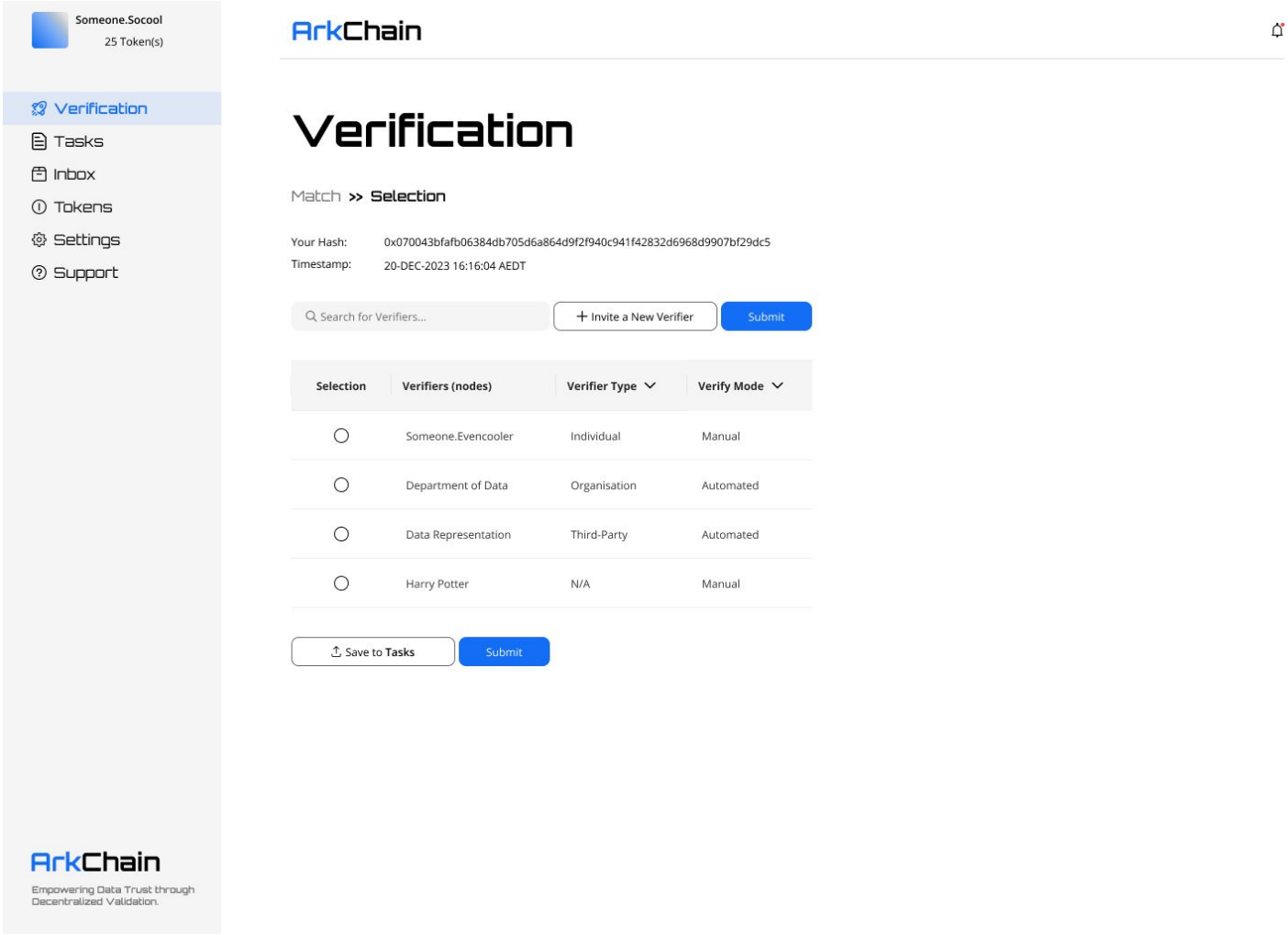




UI Showcase


Someone.Socool
25 Token(s)
Verification
Tasks
Inbox
Tokens
Settings
Support
ArkChain
Empowering Data Trust through Decentralized Validation.
ArkChain
Verification
Match
Enter your Hash for verification match...
Generate a Hash Locally
Search
Your files will not be uploaded to the internet.
Verification History
Your Hash
Timestamp
Total Nodes
Approved
Denied
Status
Action
0x070043bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf29dc5
20-12-2023 16:16:04 AEDT
4
1
0
In Progress
View
0x054683bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf2j3du
10-12-2023 12:13:04 AEDT
8
6
2
Success
View
0x094523bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf2m39f
19-11-2023 12:13:04 AEDT
33
2
31
Failure
View
0x020673bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf23dt5
08-10-2023 12:13:04 AEDT
5
5
0
Success
View

UI Showcase


Someone.Socool
25 Token(s)
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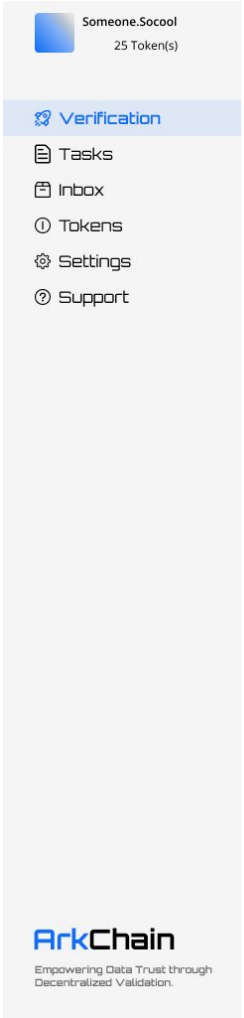
ArkChain
Empowering Data Trust through Decentralized Validation.
ArkChain
Verification
Match >> Selection
Your Hash: 0x070043bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf29dc5
Timestamp: 20-DEC-2023 16:16:04 AEDT
Search for Verifiers...
+ Invite a New Verifier
Submit
Selection
Verifiers (nodes)
Verifier Type
Verify Mode
Someone.Evencooler
Individual
Manual
Department of Data
Organisation
Automated
Data Representation
Third-Party
Automated
Harry Potter
N/A
Manual
Save to Tasks
Submit

UI Showcase



ArkChain

Verification

Match >> SELECTION >> SUCCESSFUL

Your Hash: 0x070043bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf29dc5

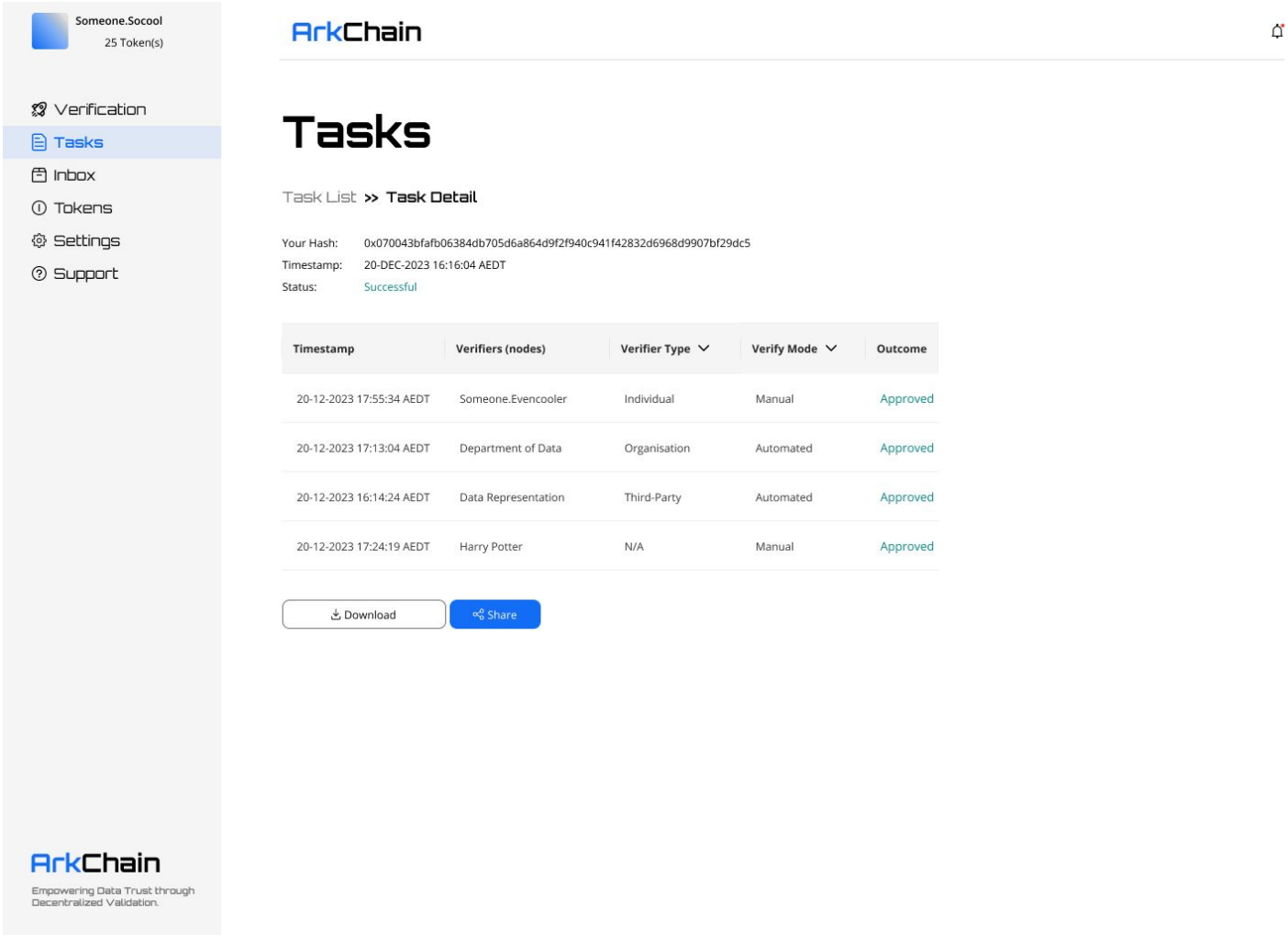
Timestamp: 20-DEC-2023 16:16:04 AEDT

Congratulations!

Your request of verification are sent to your trusted verifiers.
Once finished, Arkchain will notify you, you can check your process in “Tasks” .

Finish | Go to Task Detail

UI Showcase


Someone.Socool
25 Token(s)
Verification
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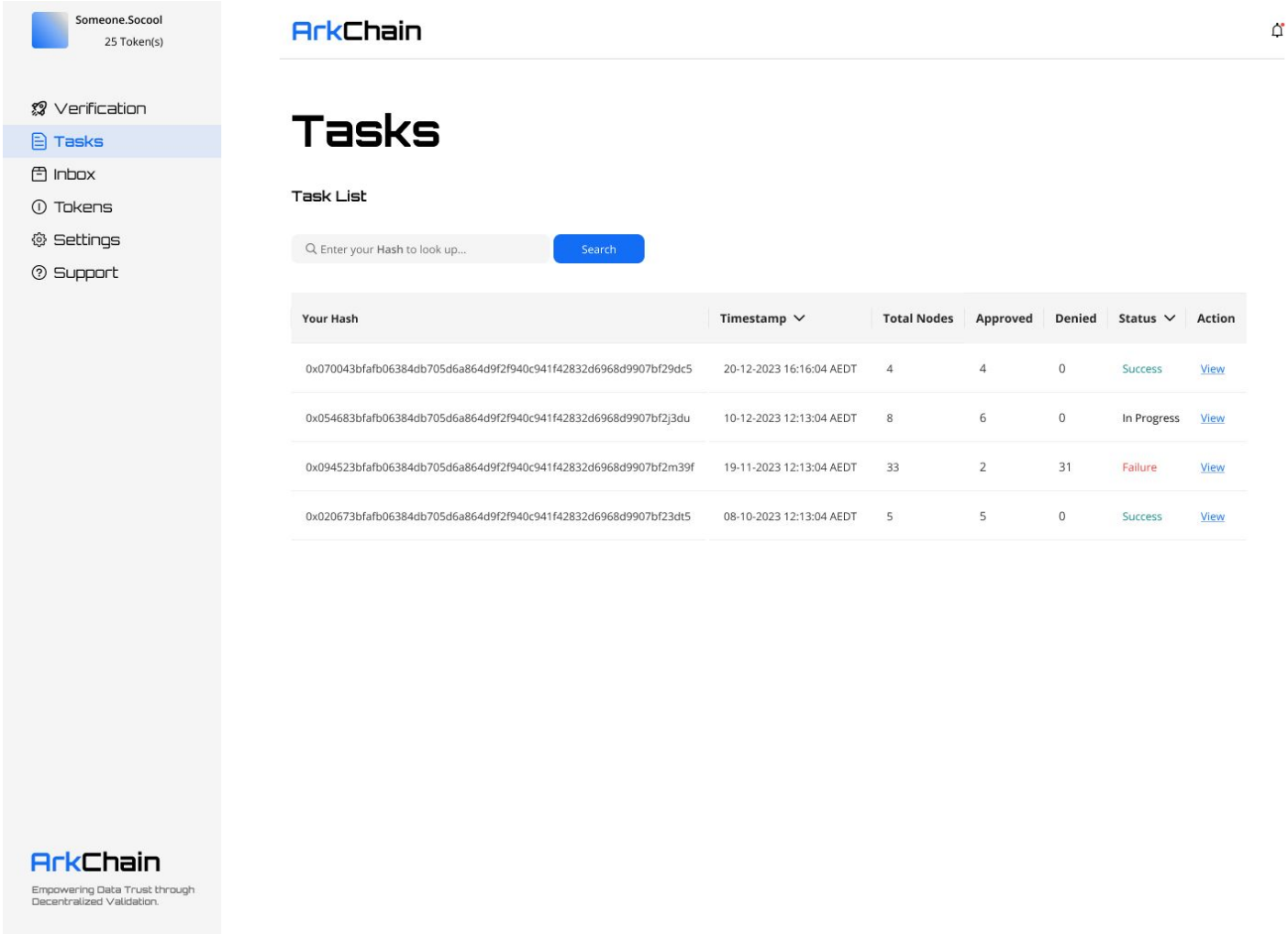
Inbox
Tokens
Settings
Support
ArkChain
Empowering Data Trust through Decentralized Validation.
ArkChain
Tasks
Task List >> Task Detail
Your Hash: 0x070043bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf29dc5
Timestamp: 20-DEC-2023 16:16:04 AEDT
Status: Successful
Timestamp
Verifiers (nodes)
Verifier Type
Verify Mode
Outcome
20-12-2023 17:55:34 AEDT
Someone.Evencooler
Individual
Manual
Approved
20-12-2023 17:13:04 AEDT
Department of Data
Organisation
Automated
Approved
20-12-2023 16:14:24 AEDT
Data Representation
Third-Party
Automated
Approved
20-12-2023 17:24:19 AEDT
Harry Potter
N/A
Manual
Approved
Download
Share

UI Showcase


Someone.Socool
25 Token(s)
Verification
Tasks
Inbox
Tokens
Settings
Support
ArkChain
Empowering Data Trust through Decentralized Validation.
ArkChain
Tasks
Task List
Enter your Hash to look up...
Search
Your Hash
Timestamp
Total Nodes
Approved
Denied
Status
Action
0x070043bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf29dc5
20-12-2023 16:16:04 AEDT
4
4
0
Success
View
0x054683bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf2j3du
10-12-2023 12:13:04 AEDT
8
6
0
In Progress
View
0x094523bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf2m39f
19-11-2023 12:13:04 AEDT
33
2
31
Failure
View
0x020673bfafb06384db705d6a864d9f2f940c941f42832d6968d9907bf23dt5
08-10-2023 12:13:04 AEDT
5
5
0
Success
View