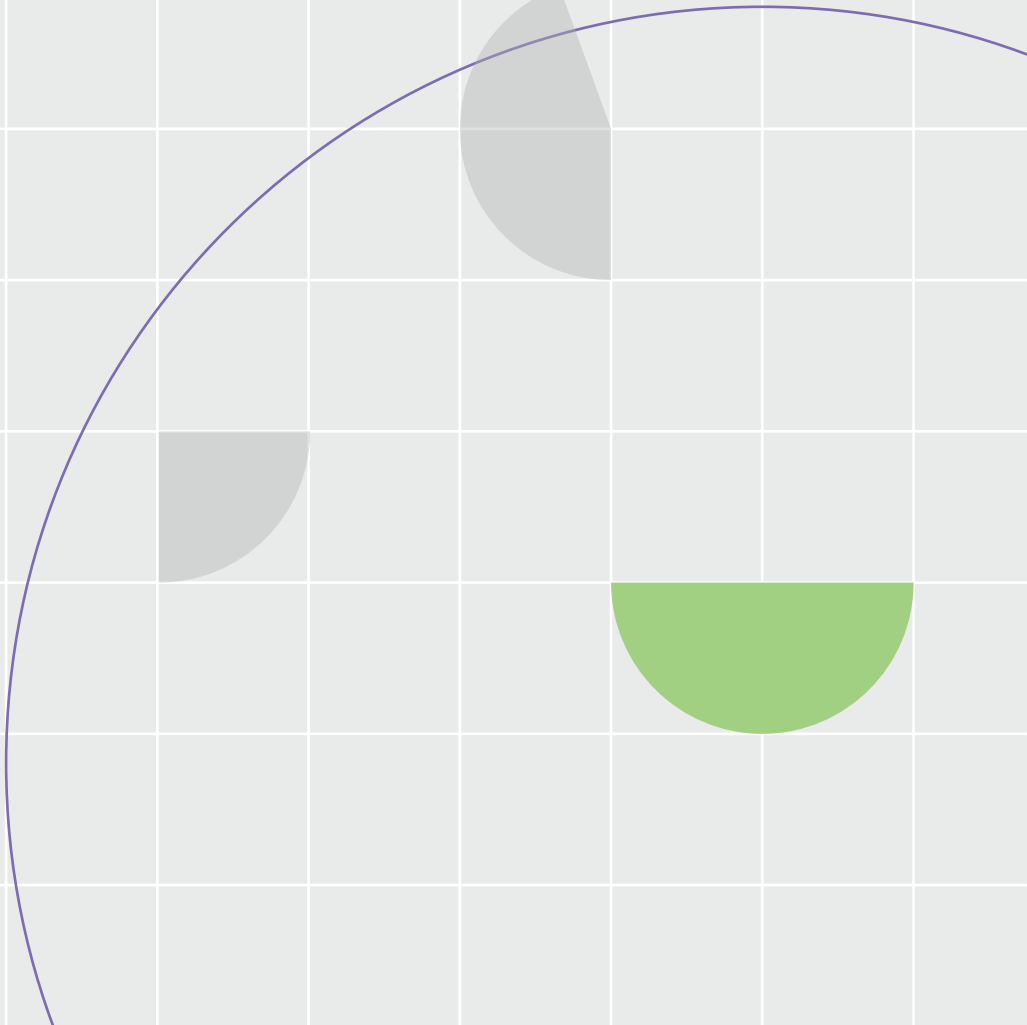
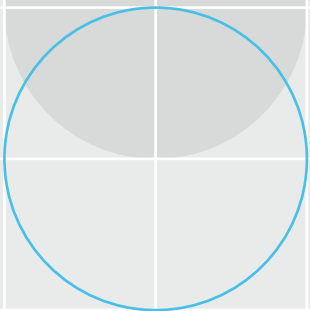
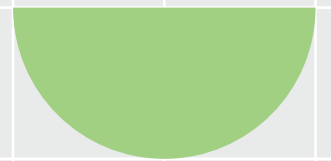
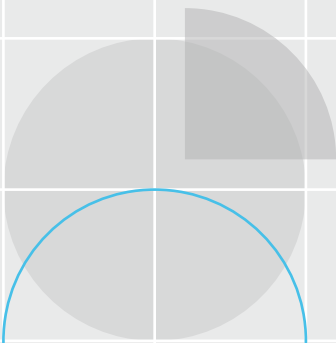
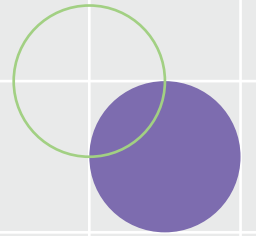
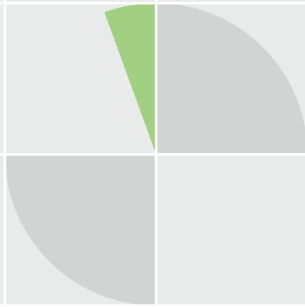
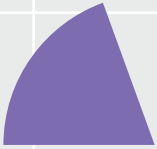




# ARCS

WHITE PAPER Ver 2.1





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# WELL-BEING



## 1. VISION

The philosophy of the Aire project is a desire to improve well-being for people around the world, not only physically, but also mentally and socially. Aire' s vision is to empower individuals through the rights to their data and the value their data holds. The ecosystem will include participants of many kinds, ranging from individuals to large data corporations. Participants will be able to transact with each other, protected by the "rule of code" enforced with smart contracts deployed onto a blockchain network. This enables businesses to buy and sell data while being compliant with personal data regulations, ultimately improving their data analytics capabilities and deriving meaningful insights. Individuals who provide information to data banks will be protected by a high level of privacy and receive rewards based on inputting data and it being used. Buying and selling data is increasingly becoming a major part of our lives, Aire' s proposed ecosystem will make buying and selling data an integrated part of our lives whilst ensuring privacy and fair distribution of data trade.

# 2 BACKGROUND

## 2-1. Challenges with personal data

In recent years, personal data has become increasingly fragmented across different services and often rests in databases without proper user consent. This leaves users without proper control of their data and, to some extent, their identity. The European General Data Protection Regulation (GDPR) was brought into EU law to address this problem, however, corporations still accumulate large volumes of personal data for analytics and

monetization. Data is often described as “the new oil” and users are fast becoming aware of the value it holds. This has given rise to several data banking businesses who strive to buy data and sell for profit, nonetheless always with the interests of large corporations in mind. Alre is built with mechanisms to give a fairer distribution of profits made from personal data by giving users self-sovereign identities.



## 2-2. Solution

Alre solves the problem of inefficient data use. Currently, each company only stores and uses a portion of the information its users leave online. Therefore, a complete and accurate profile of users cannot be collected. Users generally have negative feedback on the current use of their data because the information and/or recommendations they receive as a result of it being used are often inaccurate.

To solve these issues, Alre enables unified management of user data which allows for data to be used with consent and data rights protected. We believe that this mechanism can provide a wide range of application services for users.

We refer to the interface which can offer these services as a “next-generation bank”. The next generation bank is a comprehensive digital wallet necessary for the coming era of digital

transformation.

A single service provider will not provide all services and each service provider will provide their service as part of a next-generation bank using a single token. The next-generation bank is a digital wallet which handles these services.

Alre tokenizes valuables as security tokens through the data bank, such as stocks, real estate, art, etc., and makes payments/transfers using cryptocurrencies. Further details are described in “future development” section.

Alre utilizes this data to create new evaluation standards. In addition to ensuring compatibility with other participant companies on the Alre platform, Alre will take the initiative in handling new technologies and concepts regarding user data management to become a true “user sovereign” platform.

## 2-3. Market Size

Alre targets a wide variety of markets, the two main markets are: the information industry market, Alre's information banking initiative will target this market; and the financial refugee market, as described in the "future development" section. To give an example, a

decentralized digital identity (DID) infrastructure can be developed by utilizing data stored in an information bank. As a result, it is possible to target unbanked people who do not have access to financial markets since they do not currently have a digital identity.

### 2-3-1. Information industry market

As the value of personal data increases, the markets targeted by information banks are growing year by year. Alre acquires various types of personal data, adds value to the data, and returns it to the user.

Looking at a specific use case, this can be applied to the marketing and advertising sectors. The table below shows the average information value per year for the real estate, lifestyle, finance, health, and beauty sectors. For example, if the unit price is 30 to 50 million JPY for buying and selling a detached house or condominium, when a sale is established by providing the customer status, it is common to pay an information provider fee of 300,000 to

500,000 JPY (1% of the sale price) as a contingent fee. If the average purchase cycle of a detached house or apartment is estimated to be around 30 years, the annual information provision fee can be calculated to be between 10,000 and 16,000 JPY. Similarly, if you calculate it for life, finance, health, and beauty, and calculate the total value of the information provision fee per year, it will be between 41,000 and 95,000 JPY. In other words, here it can be assumed that the value of user information is worth 41,000 to 95,000 JPY per year. Since what is mentioned in this table is part of the market, it is considered to be worth at least 100,000 JPY.

Category	Product	Unit price	Average purchase interval	Lease fees for success fees (information value)	Per year average information value (information value ÷ average purchase interval)
Real estate	Detached house, condominium	50 million JPY (metropolitan areas), 30 million JPY (all of Japan)	30 years	1% of the transaction amount (300,000 to 500,000 JPY)	16,000 to 66,000 JPY
Real estate	Renovation	2 million to 5 million JPY	15 years	5% of contract amount (100,000 to 250,000 JPY)	16,000 to 66,000 JPY
Real estate	Apartment, apartment rental brokerage	120,000 JPY/month (metropolitan areas), 60,000 JPY/month (all over Japan)	5 years	Half month rent (30,000 to 60,000 JPY)	6,000 to 12,000 JPY
Life	Furniture	120,000 JPY/month (metropolitan areas), 60,000 JPY/month (all over Japan)	10 years	5% of purchase price (15,000 to 50,000 JPY)	5,000 to 10,000 JPY
Life	Home appliances	300,000 to 1 million JPY	10 years	5% of purchase price (15,000 to 50,000 JPY)	5,000 to 10,000 JPY
Finance	Investment trusts	3 million JPY	5 years	5% of purchase price (15,000 to 50,000 JPY)	9,000 to 30,000 JPY
Finance	Life insurance	20,000 to 50,000 JPY/month	10 years	2.5 months of monthly premium (50,000 to 125,000 JPY)	5,000 to 12,000 JPY
Finance	Non-life insurance	100,000 to 150,000 JPY/month	1 year	6% of the insurance premium (6,000 to 9,000 JPY)	6,000 to 9,000 JPY
Health	Supplements	5,000 to 30,000 JPY/month	5 years	10% of the purchase price (6,000 to 36,000 JPY)	10,000 to 70,000 JPY
Beauty	Body hair loss	200,000 to 400,000 JPY	20 years	20% of the purchase price (40,000 to 80,000 JPY)	4,000 to 20,000 JPY
Total of 10 items					41,000 to 95,000 JPY

Also, from an economic point of view, looking at the size of the Japanese domestic market, the total advertising market in Japan in 2018 was 6.2 trillion JPY and the internet advertising market was 1.5 trillion JPY. Together, there is a total market size of 7.7 trillion JPY. Dividing these by the total population of Japan, it can be calculated that the annual advertising cost per person is 64,000 JPY and considering that the market is expanding, it is reasonable to estimate that it is worth around

100,000 JPY per person per year. IFA aims for a total of 50 million Alre users in Japan and 25 million Alre users overseas by 2024, hence the maximum value of Alre is estimated to be 100,000 × 50 million = 5 trillion JPY. By 2029, the target is 50 million users in Japan and 350 million users overseas, with the value of Alre estimated to be 100,000 × 400 million = 40 trillion JPY. Please note that this is dependent on the market share of Alre in each sector.

## 2-3-2. Financial refugee market

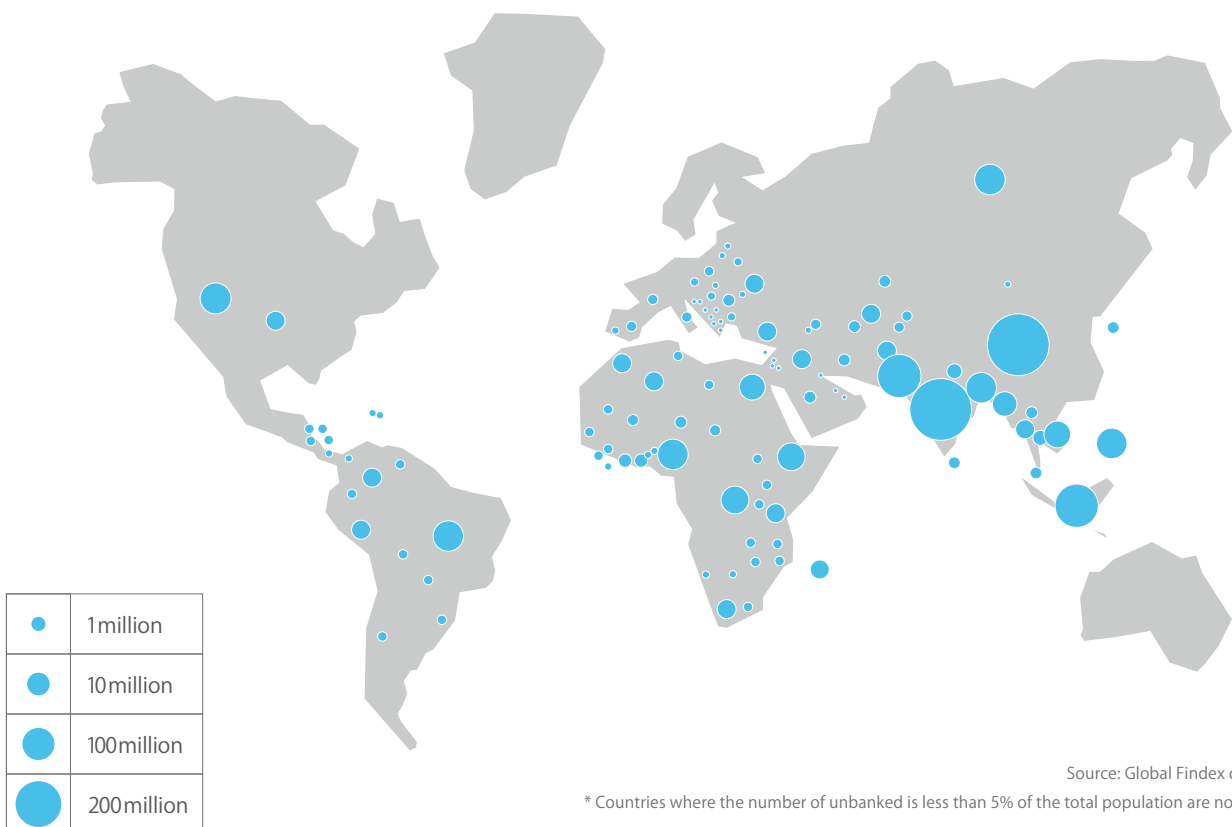
According to a World Bank survey, around 1.7 billion adults worldwide did not have bank accounts as of 2017, with the majority of this population living in developing countries. The top four countries with the largest number of people without bank accounts are China (approximately 230 million), India (approximately 190 million), Pakistan (approximately 100 million), Indonesia (approximately 95 million), Nigeria, Mexico, and Bangladesh. Adding these populations together alone constitutes for around half of the global population without bank accounts (Figure 1). Looking at gender, 56% of those without bank accounts are women, with several cultural reasons behind this. Furthermore, 30% of those without bank accounts are aged between 15 and 24.

Those who do not have bank accounts are often referred to as “the unbanked” . Whether or not you have a bank account is often related to income level, but also education; the unbanked tend to have comparatively low levels of education.

There are two main reasons why the unbanked do not

have bank accounts: it is an issue of economic power and creditworthiness. We believe that this issue can be cleared if creditworthiness can be secured on our platform.

There are 1.1 billion people around the world who have mobile phones or smartphones, including two-thirds of the unbanked population. This ratio is over 50% in India and Mexico, and over 82% in China. In terms of gender, the ratio is over 70% for males and over 60% for females. The spread of our platform can help address the challenges of financial inclusion. Alre has the potential to provide people who do not have a bank account with an ID/wallet that is much cheaper to access than a bank account. By inputting their personal information, they can visualize their potential through scoring, which is not measured by existing financial institutions, and receive financial services they previously could not. It is safe and secure regardless of how the scoring is used, and we will develop and deliver an environment where people can use credits called “money”.



Source: Global Findex database

\* Countries where the number of unbanked is less than 5% of the total population are not shown.

# 3. About Alre

Alre is an ecosystem centered around data banks and their users. It provides functionality for data banks so that they can operate effectively and transact with businesses and individuals. This section outlines Alre, its functionality, and its business model. It also includes a description of measures to prevent data tampering through using blockchain technology and interconnected data bank hubs.

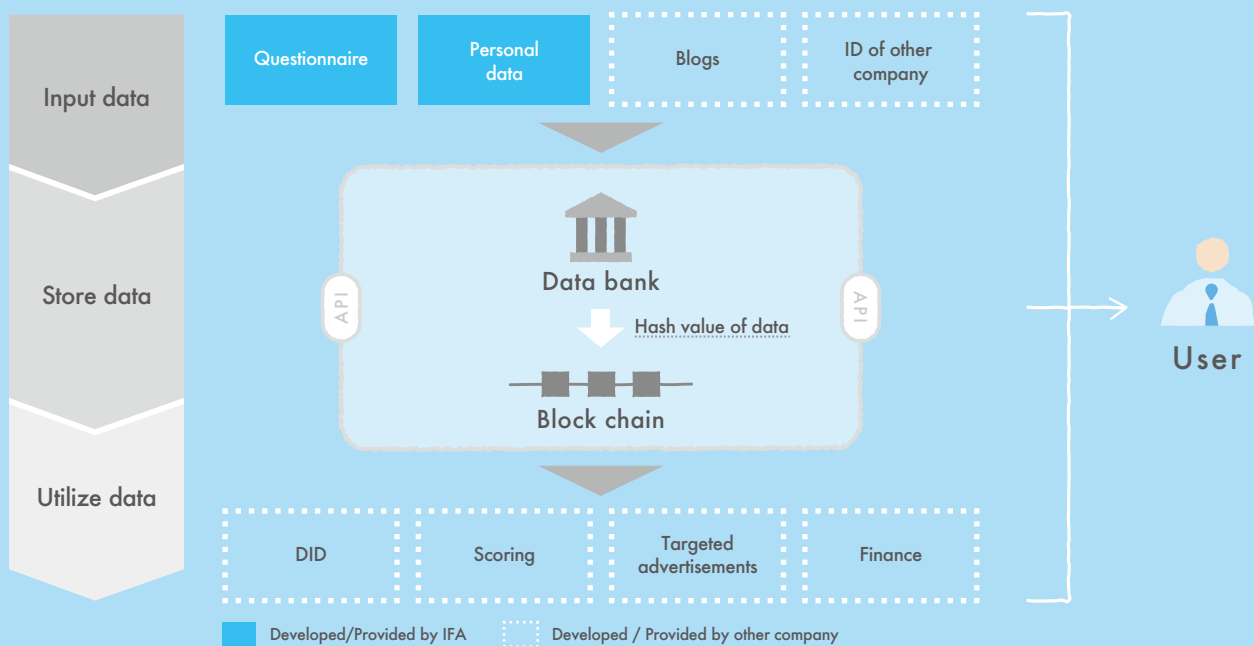
## 3-1. Overview

Alre provides functionality for management and storage of various data structures in "data banks", which are essentially a business to monetize data. Network participants can access and build on Alre via custom-built applications or directly through proprietary APIs. This provides a flexible framework which makes it easy for companies to build their business scenarios and applications with powerful insights from data analytics.

## 3-2. Functionality

Alre comprises of three main functionalities: information input, information storage, and information utilization. Data banks are at the core of the system for storing data, and APIs enable facilitation and orchestration of data flow. Alre can handle different data sources and manage data ownership, for example, fragmented data from different sources can be linked to rightful user identities in the data bank. As a result, users can manage their data in one integrated network.

The three main functionalities are illustrated below:



### 3-2-1. Information input

Users can input basic personal information such as gender and address, answers from questionnaires, text from blogs, and links to social media accounts. In turn, based on the information inputs and frequency of utilization, they will receive tokens as incentives. Alre is designed to handle high throughput and complex data structures from emerging technologies such as IoT and artificial intelligence with the consent of the user, including location data from smartphones, healthcare data from smartwatches, as well as payments and web browsing history.

### 3-2-2. Information storage

Information is stored in the data bank system. To preserve the integrity of data, the system will automatically calculate hash values for the data and store it in on a blockchain. This allows anyone with the data to verify whether or not it has been tampered with.

### 3-2-3. Information utilization

Proprietary Alre APIs allow companies to integrate their businesses and applications with data banks or even offer their own data bank services. The ecosystem will allow technologies to handle different business scenarios, such as implementation of W3C DID standards, or reputation and scoring system frameworks. The network keeps an immutable record of which participants have been granted access to which data and subsequently which rewards have been distributed to which data providers.



# 3-3. Business model

This is where Alre creates revenue. Since token holders can participate in a variety of ways, We provide a mechanism for the ecosystem to grow naturally. In Alre, payments are made with tokens. For details, see the chapter on the token economy.



## IFA

IFA will collect fees from third parties when they access user data in data banks. To attract more third parties to use the data bank infrastructure, it is necessary to collect more extensive user data. Therefore, by distributing tokens to users as an incentive, users are incentivized to input more information.

## Third parties

Third parties can acquire data from the data bank to drive their analytics. The data bank will be a cheaper alternative to traditional data aggregators and fully compliant since users give consent and are rewarded.

## User

Users will be rewarded based on the volume, type, and quality of the data they store. Rewards will be distributed each time data is acquired, which will motivate users to input more useful data into the data bank. Rewards come as payment tokens which can be used as a payment method when using Alre service applications provided by third parties.

## 3-4. Data tampering prevention

As mentioned above, Alre stakeholders can plan, develop, and use various services and applications by making use of the data that is managed and operated in data banks. At this time, user data must be “correctly” managed and operated. Here “correctly” means that the data has not been changed, deleted, or viewed without the permission of its owner.

Until now, data has been managed and operated by one or a few companies who provide services for users, leaving data use solely in the hands of the companies. However, recently, there have been many controversies of companies using user data to secure profits illegally. Moreover, for the company that receives the data, it is impossible to exclude the possibility that the data pro-

vided has been arbitrarily changed by the provider company. Looking at these points of concern, data deposited to such platforms cannot be fully trusted.

Alre uses blockchain as a second data store. To store data on a blockchain, it requires the consent from a majority of the nodes, or enterprises, constituting the blockchain network. For this reason, it is possible to prevent a small number of nodes from illegally editing the stored data. Once data is stored on the blockchain, it can never be changed or deleted in secret, since all change histories are stored onto the blockchain. Therefore, with blockchain it is possible to prevent data from being falsified.

## 3-5. Data bank hub concept

To expand the network beyond data inputs of users to the data bank, Alre will allow other data marketplaces and sellers to participate in the network. They will not have to re-enter data into a data bank, instead they will be able to offer their existing data bank. This is a

concept of a “hub” where multiple participants can transact data with each other. The network will exponentially increase its value as more data participants offer their data, since big data is required for data analytics to have meaningful insights.

# 4 - TECHNOLOGY

Several technological milestones must be met in order to carry out ARCS vision and build an ecosystem which allows businesses and users to transact with personal data in a secure and private manner, and distribute rewards fairly. ARCS team takes a pragmatic approach to the development and breaks down development into components that eventually will make up the ecosystem. The development philosophy is lean and agile, which means that the requirements will continuously be tested with the real users of the ecosystem e.g. users and businesses.

The major pieces of developments in the ecosystem are 1) the public blockchain 2) the data bank 3) clients and dApps 4) smart contracts for business logic. Each piece will be broken further into components and go through

the software development life cycle.

First version of the blockchain will be able to facilitate data bank transactions with high levels of security. Following versions will implement privacy features, digital identity, scoring, and reputation mechanisms based on research. The data bank will initially be a centralized database under the governance of IFA Corporation. Based on research ARCS team plans to replace this with a decentralized database solution such as IPFS. The first clients and smart contracts will focus on standard operations of the data bank such as register users and deletion of personal data.

To get the development started ARCS team developed a PoC for the data bank.

## 4-1 PoC as starting point

In terms of technology, the goal is to build an ecosystem powered by ARCS proprietary blockchain, clients and several data banks. This includes extensive research, development of components, and testing. Not only does it impose challenges in terms of selecting a protocol to build with based on requirements, but also considerations whether it's

feasible to build own proprietary protocol. To get things started, a PoC has been developed with Parity Substrate framework because it accommodates most of the requirements within security, scalability, modularity, flexibility, performance, and interoperability, along with the functional requirements for data banking.

The PoC verify technological feasibility of following:

\*ARCS token can be issued as base currency in proprietary public blockchain network

\*The network can achieve trustless data bank architecture so that no one can control the users data and users will get rewarded in a decentralized manner

\*A system without user transaction fees in order to offer good user experience

## 4-2 PoC use cases

The PoC confirms that following use cases can be build with blockchain and not compromise user experience in comparison with traditional systems:

1. When users register their data, they will receive tokens as incentives
2. Users can delete their data anytime they please

3. Authorities or corporations can make requests to access user's data
4. Users can always control which authority or corporation that will have access to their data by respondings to data access requests
5. Users can receive tokens as reward for granting companies access to their data

## 4-3 Trust model

In order to determine functional requirements and system architecture, a discussion of the trust model must take place. A trust model is the underlying programmable logic of the system. If all programmable logic is implemented in a decentralized blockchain network, it's fully trustless. On the other hand, if the logic is located on a centralized server with a central authority, it's fully trustful. ARCS vision is to provide a trustless-based data bank, which means that as much as possible of the programmable logic must exist on the public blockchain and users can interact with the blockchain by using their digital signatures. With this, we can ensure user's self-sovereignty, ownership of data, and fair distribution of rewards.

However, we found that there are several technical challenges in building a fully trustless trust model. For example, in the PoC, it's desirable to eliminate transaction fees for the users in order to create easy and comfortable interaction with the public blockchain. To realize zero transaction fees, the transaction must be signed twice; first by users then by servers just like meta-transactions as described in ERC1776. Therefore, it's decided to introduce an entity called IFA as administrator of the system. IFA is a legal entity with a centralized database and serves as a middle-man who bridges communication between users and the public blockchain in order to ensure good user experiences. Whenever users want to interact with the blockchain, they send their signed transactions to the IFA entity, IFA then signs and broadcasts the transactions to the blockchain. By doing so, users do not need to worry about interacting with the blockchain and make costly mistakes. On

the other hand, the blockchain stores hash of the user's data, hash of the access requests, and some system parameters.

Storage of raw data is another major consideration, especially for personal data. To ensure user's self-sovereignty, the ARCS ecosystem uses a public blockchain. However, data stored on public blockchains is visible to everyone and this would result in compromising user data privacy. Therefore, in this PoC, a centralized database is in place, more specifically a mongo DB, which is managed by IFA. There are some options to preserve privacy of user data on public blockchains such as Zero-knowledge proof and Multi-party computation, and IPFS is a solution for distributed storage of data outside of the blockchain. However, all of these approaches are not included in the PoC and still under research as well as ways to store data. That's why it's decided to use an IFA-managed database for data stores. To prevent IFA from data tampering, everyone can validate that IFA behaves correctly by matching the hash stored in the public blockchain with the calculated hash that is obtained from IFA. In the future, it's planned to switch to a centralized data store with decentralized data storage such as IPFS.

In conclusion of the trust model, PoC has mainly 3 entities, users, IFA and the blockchain. IFA acts as a trust anchor to eliminate the user's burden of communicating with the blockchain. Everyone can validate IFA's behavior by checking the matching of the hashes obtained from blockchain and IFA's managed data store.

## 4-4 Functional requirement

Based on the trust model above, following functional requirements must be met in order to realize all use cases.

Functions	Access			
	IFA	User	Corporate	Blockchain
Store user data in IFA' s managed data store	×			
Sign transaction with user' s/corporate' s signature, and send it to the blockchain. (IFA pays transaction fees instead of users/corporates)	×			
Send hash of the user' s data to blockchain	×			
Send corporate' s access requests to users, to blockchain.	×			
Register acceptable data attribute	×			
Delete user' s data from data store upon user' s data delete request. At the same time, mark the data deleted on the blockchain.	×			
Register raw and hash of data, and send them to IFA.		×		
Check the list of the registered data.		×		
Check and response to the data access request from corporates.		×		
Check the access histories that show who accessed the data at when.		×		
Send data delete requests.		×		
Check the list of the users.			×	
Send data access requests to users.			×	
Check the status of the data access requests.			×	
Download user' s data that is approved by the users.			×	
Validate that the registered data is not falsified.		×	×	
Store the system parameters				×
Store hash of the user' s data				×
Store access requests from corporates to users.				×
Store data access histories				×
Store the data status (active or deleted)				×
Send tokens to the corresponding users as incentive once data is stored on the blockchain.				×
Send tokens to the corresponding users once the data registered by the users is accessed by corporates.				×

All of the functions that the blockchain offers is performed in a decentralized manner. That is, the operations and data are automatically processed and no one interrupt/tamper with these.

## 4-5 Architecture

### 4-5-1 SYSTEM COMPONENT

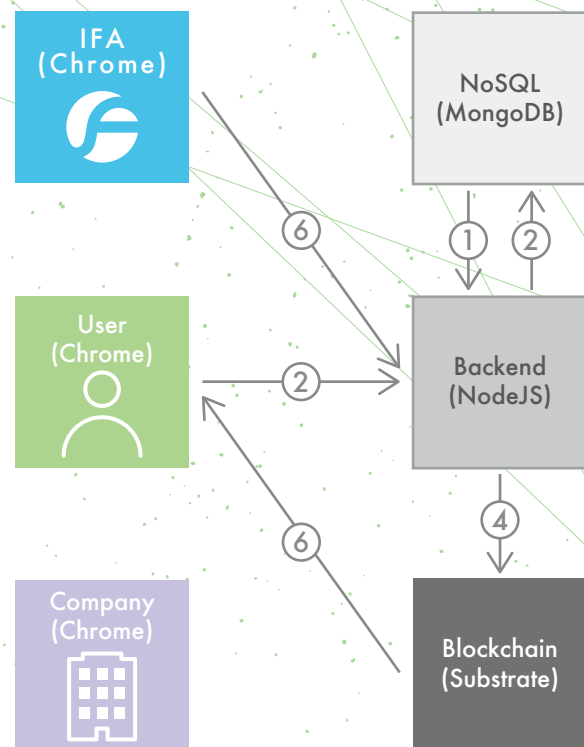
<b>Client application</b>	<ul style="list-style-type: none"> <li>* Web-based applications, coded in JavaScript (TypeScript)</li> <li>* Reason: easy to implement and maintain.</li> </ul>
<b>Backend (managed by IFA)</b>	<ul style="list-style-type: none"> <li>* NodeJS</li> <li>* Reason: To make maintenance cost lower to match the language with client application</li> </ul>
<b>Database (managed by IFA)</b>	<ul style="list-style-type: none"> <li>* MongoDB</li> <li>* Reason: to match the data structure with blockchain (Key Value Store)</li> </ul>
<b>Blockchain</b>	<ul style="list-style-type: none"> <li>* Developed with Parity Substrate (details are described in implementation details section)</li> </ul>

### 4-5-2 OPERATION AND SYSTEM FLOW

Below is a illustration of the the architecture and system flow of the 5 use cases in the PoC:

#### User data registration

- ① Register data attributes in DB
  - a. (Transaction: signed with data attribute + nonce hash, data value + nonce hash, initial registration or not)
  - b. Send raw data (including nonce)
- ③ Check data hash (if false, notify user of error)
  - a. Whether data attribute is registered in DB
  - b. Is the value incorrect?
  - c. Whether the signature is correct
  - d. Is the hash correct
- ④ Double sign and send transaction
  - a. Pay commission
- ⑤ The hash is stored and the token is paid to the user on the blockchain
- ⑥ User gets and confirms data on chain
  - a. Is the hash correct
  - b. Whether I have more tokens

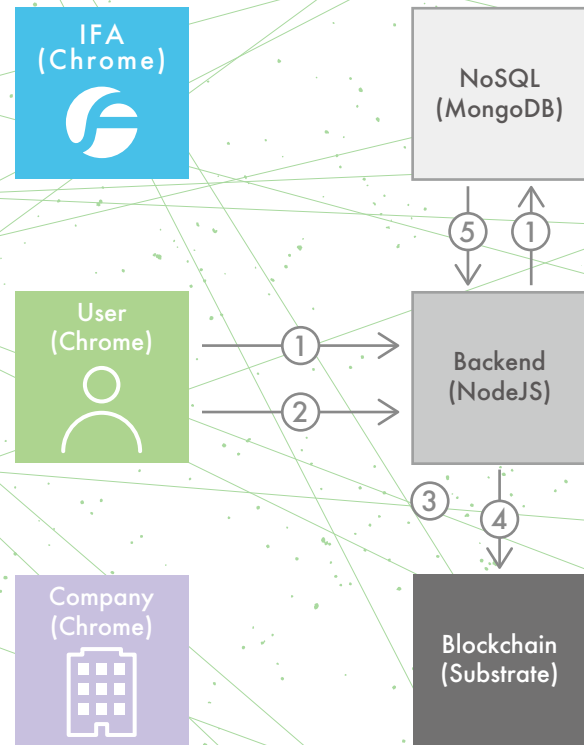


Architecture

Data deletion request from user

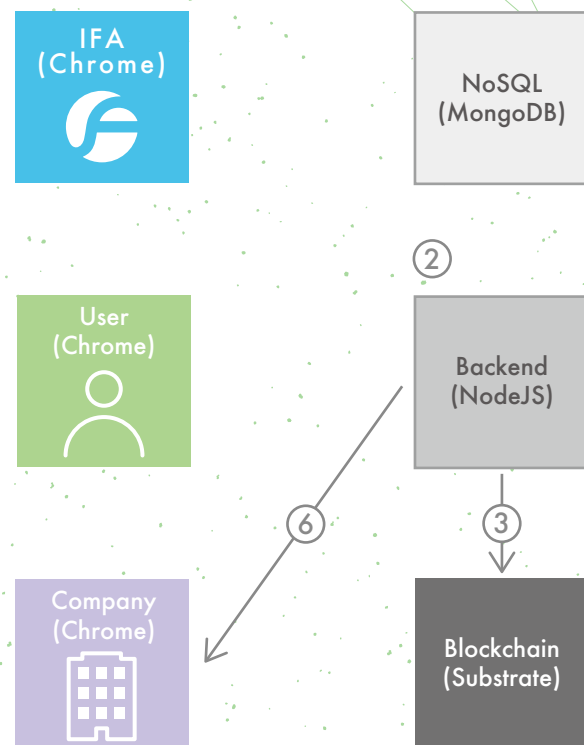
- ① Obtain a list of data attributes registered by the user from the DB
- ② Send signed data delete transaction to server
  - a. (Data attribute hash, delete flag (0 or 1))

Transaction signed
- ③ Confirm transaction
  - a. Whether data attribute is registered in DB
  - b. Value is correct
  - c. Whether the signature is correct
  - d. Is the hash correct
- ④ Double-sign and send delete data transaction to blockchain
- ⑤ Hard delete the relevant data from the DB (trust the administrator if you have hard deleted)



Sending access requests from companies

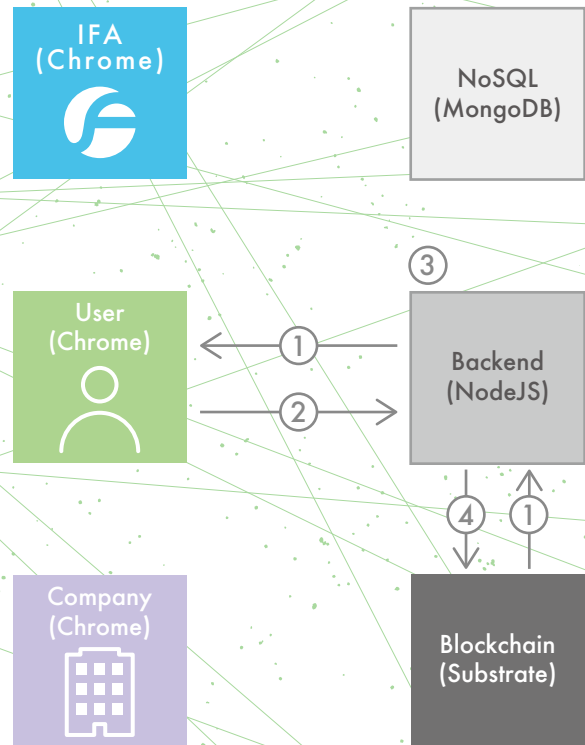
- ① Select the user data attribute to send the access request, sign and send
  - a. Transaction to store (user, company, hash of (data attribute + nonce))
- ② Confirmation of transaction (if false, notify company of error)
  - a. Whether user / company / data attributes are registered in DB
  - b. Is the value incorrect?
  - c. Whether the signature is correct
  - d. Hash of (data attribute + nonce) is correct
- ③ Doubly signed and send access request transaction to blockchain
  - a. Pay commission
- ④ Notify user of access request



Architecture

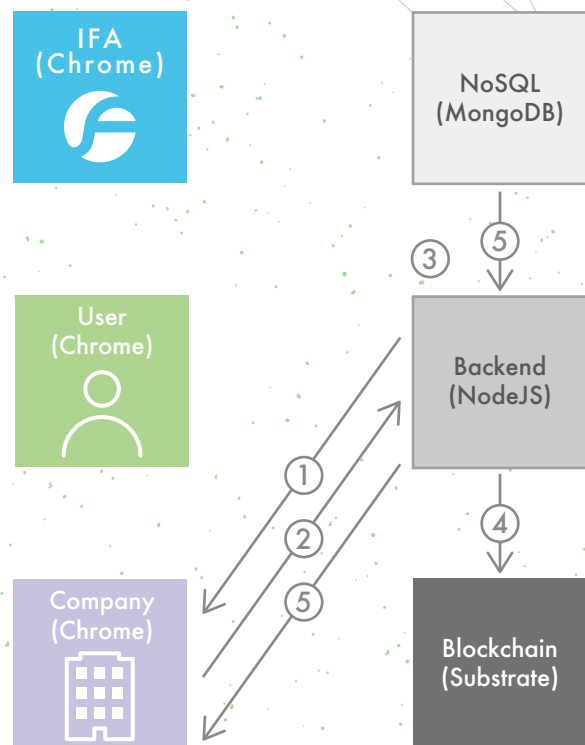
User responds / cancels access request

- ① Get access request to yourself from blockchain
- ② Send signed reply transaction to server
  - a. (Access request ID, Reply (0 or 1))
- ③ Confirm transaction
  - a. Is the value incorrect?
  - b. Whether the signature is correct
  - c. Is the response correct
- ④ Double reply and send reply transaction to blockchain
  - a. Pay commission
- ⑤ Notify the company of the result of the request



Companies get user data

- ① Obtain the response to the access request issued by the company from the blockchain
- ② Send signed access history transaction to server
  - a. Send transaction with access request ID to server
- ③ Confirm transaction
  - a. Whether the signature is correct
  - b. Has the corresponding data been deleted?
  - c. Whether the response status of the access request is "Approved"
- ④ Double-sign and send access history transaction to blockchain
  - a. Fees taken by IFA
  - b. Token passes from company to user
- ⑤ Acquire the corresponding raw data from the DB and send it to the company



## 4-6 ARCS chain implementation details

Substrate was used as template for the PoC development because

- It's difficult to implement blockchain from scratch
- It was considered to fork projects such as Ethereum, EOS.
- However, the fundamental architecture and system doesn't match the PoC objectives.
- Substrate is a kind of blockchain template with great flexibility and modularity
- It's possible to implement original blockchain simply by choosing suitable Substrate modules, each of which is component like consensus, p2p networking, etc, and imple-

menting some custom modules

It's possible to switch the behavior of the blockchain easily by switching between the modules

ARCS chain implementation

- All of the functionalities marked "x" in the column "blockchain" on the table in the Functional requirement section are implemented by using Substrate Custom Runtime Module

The PoC uses a permissioned type blockchain. However, in future versions it's intended to use permissionless type blockchains simply by replacing the consensus modules

## 4-7 Going ahead

The PoC only covered a few components of the ARCS ecosystem. However, the ones covered were successful and confirmed feasibility and requirements. This will serve as a foundation for future development. The future development will also test components with other blockchain protocols.

The next intermediate development steps is to build PoC for digital identity, clarify whether to use existing protocol or develop own proprietary, and select protocol for TestNet development.



# 5.Token economy

The Alre token economy is centered around the ARCS token. Below is a description of the token, its economy, and its functionality.

## 5-1.ARCS token

ARCS is the native token of Alre. It can be held in wallets that support the ERC-20 token standard and be traded on exchanges which list ARCS. It will fluctuate according to market conditions.

ARCS is mainly used for the following purposes:

### Incentives for users

Many internet users feel uncomfortable when providing personal data to services due to the recent public knowledge of large corporations misusing personal data. Alre incentivizes users for the information they provide, which is expected to lower resistance to storing personal data.

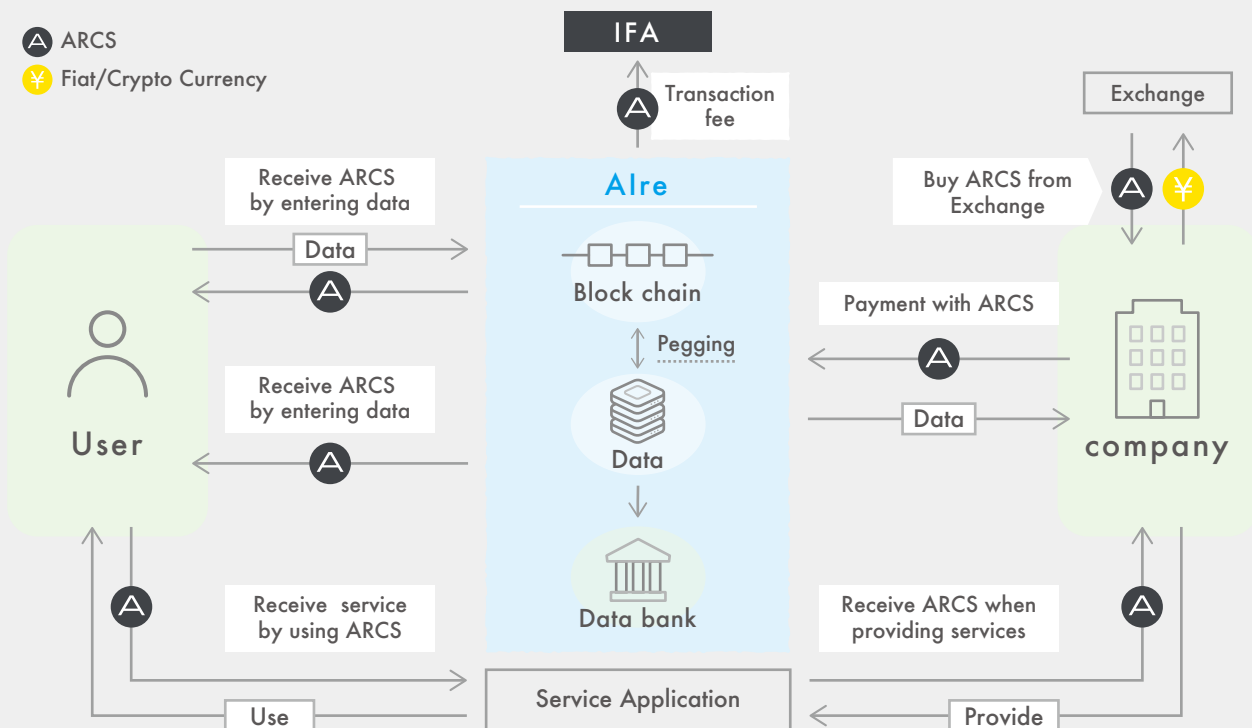
### Rights to use the Alre service

The token economy is designed to expand the ecosystem organically since participants will receive unique benefits from using the ARCS token as opposed to fiat currencies. The core value of Alre is the data which the data banks hold and ARCS is the global network currency which data buyers can use to buy data with.

## 5-2.Token flow

Below is a demonstration of the ARCS token flow:

- 1.Users input data into the Alre data bank and receive ARCS as a reward;
- 2.Companies who wish to acquire data from the data bank will first buy ARCS from an exchange;
- 3.Companies can then buy data from a data bank with ARCS. At the same time, users will be rewarded for their data and IFA will collect a commission fee for delivering the service;
- 4.Companies can utilize the data for their services and offer it to Alre users in return for ARCS.



## 5-3.Future development

ARCS is the native token of Alre. It can be held in wallets that support the ERC-20 token standard and be traded on exchanges which list ARCS. It will fluctuate according to market conditions.

ARCS is mainly used for the following purposes:

## 5-4.Decentralized digital identities (DIDs)

Blockchain wallets can manage cryptocurrencies such as ARCS, which allow users to transfer and receive digital assets. The rise of digital identity has sparked new standards and applications e.g. decentralized identifiers (DIDs) from the W3C. With the notion of identity, it will be possible to

manage a self-sovereign identity in a wallet as well. Alre plans to implement DIDs as an integrated part of the blockchain so that users can assign attributes to their digital identity and claim verifiable credentials from blockchain-powered claim issuers.

### Crypto assets

Alre will develop a wallet specifically for ARCS, payment tokens, and associated services. This product will enable users to transact with tokens in the ecosystem and use tokens for meaningful purposes instead of holding them purely for speculation. This is a step towards the establishment of a

next-generation bank. The core team will allocate significant resources for this because it is important to develop a UI/UX which is domain-specific and more advanced than existing crypto wallets. For example, this would include a UX which enables asset exchange within messages for user convenience.

### Personal information as digital assets

Personal information is a different asset class to cryptocurrencies. Implementation of DID standards can facilitate personal data linked to an ID and build comprehensive identity profiles. Digital IDs with blockchain solutions give users self-sovereignty over their data and make it easier to prove one's identity and authorize others to access it.

## 5-5.Financial assets

It is assumed that the bank API will be used in cooperation with existing banks. It will be possible to integrate financial data of existing banks and personal information with Alre to provide more sound and fair services.

As a precedent, banks in the Netherlands (ING), Germany (Fidor Bank), the United Kingdom (Barclays), Spain (BBVA), and more, have already released bank APIs and encouraged startups in other industries to participate in the financial industry. As banks begin to evolve and the question of how banks should be run is faced, from experience we see the value in them working with companies in other industries to make finance more

accessible to others. The push to release banking APIs has had a major impact on the movement in Europe. In Japan, a banking law amendment made in May 2017 included an obligation to release APIs. Although it is not yet obligatory worldwide, we expect that open APIs will become mainstream in the future.

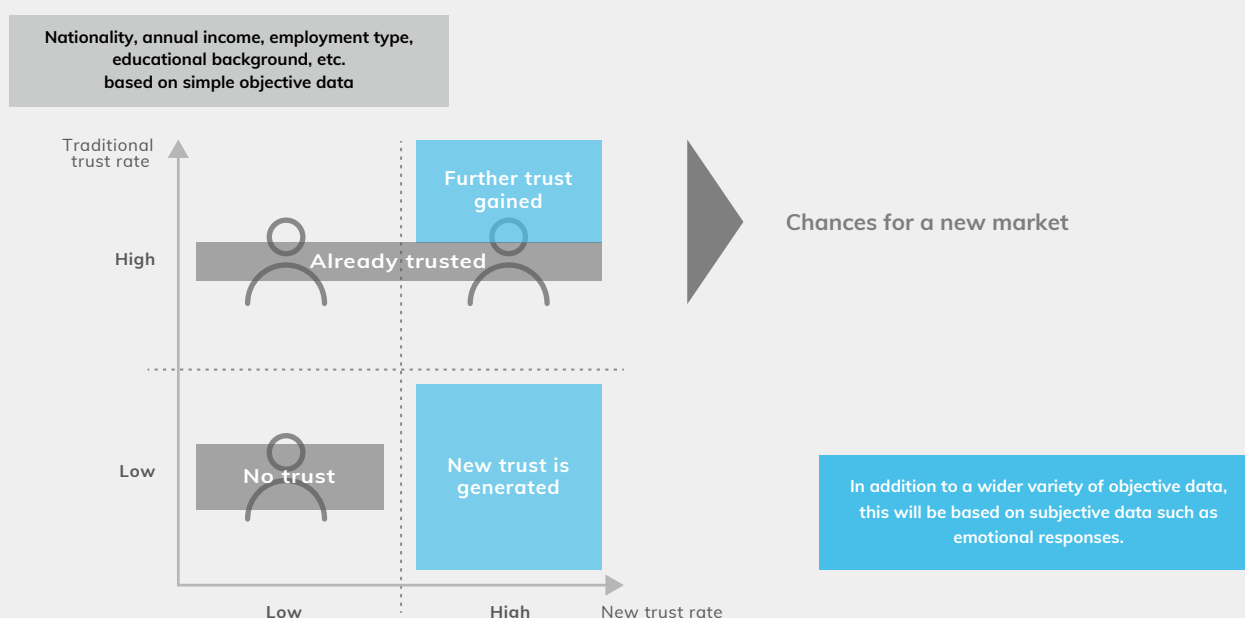
Coexistence with existing banks will ensure a high level of data and risk management. Also, it will help identify the behavioral patterns and trends of their users with other services, and solve the problem of limited credit information, which is one of the core reasons why startups and young people find it difficult to obtain loans from banks.

## 5-6.A new credit standard

“Credit” in the financial context has so far been based solely on simple objective data such as nationality, annual income, and employment status. For this reason, trust has heavily relied on the condition in which people are born into and this has never been corrected. Also, the possibilities for a person with a low credit score to win higher credit are limited. In other words: once credit is damaged, it is difficult to recover. Therefore, by using all kinds of data accumulated in Alre's data bank, Alre believes that this can build a new credit

criterion which has never existed before. In these new criteria, in addition to objective data of the individual, their future potential can be evaluated by also taking into account subjective data such as feelings, enthusiasm, and other emotions. As a result, it is possible to reach out to users who have not been able to benefit from financial services until now. In combination with the aforementioned DID solution, a variety of financial services can be provided at once.

By utilizing the abundant data accumulated in Alre, users can receive trust



### 5-6-1. Scoring

In recent years, various scoring services have appeared. Many of them are scored based on an objective and single index. For that reason, it is a structure which easily discriminates against people with lower scores. Therefore, a scoring service based on a new credit criterion

will be created. In this scoring service, scores are calculated from various viewpoints, for example, activities and humanitarian causes an individual has participated in. Combining such factors increases the possibility of providing services more finely tailored to individuals.

### 5-6-2. Lending and funding

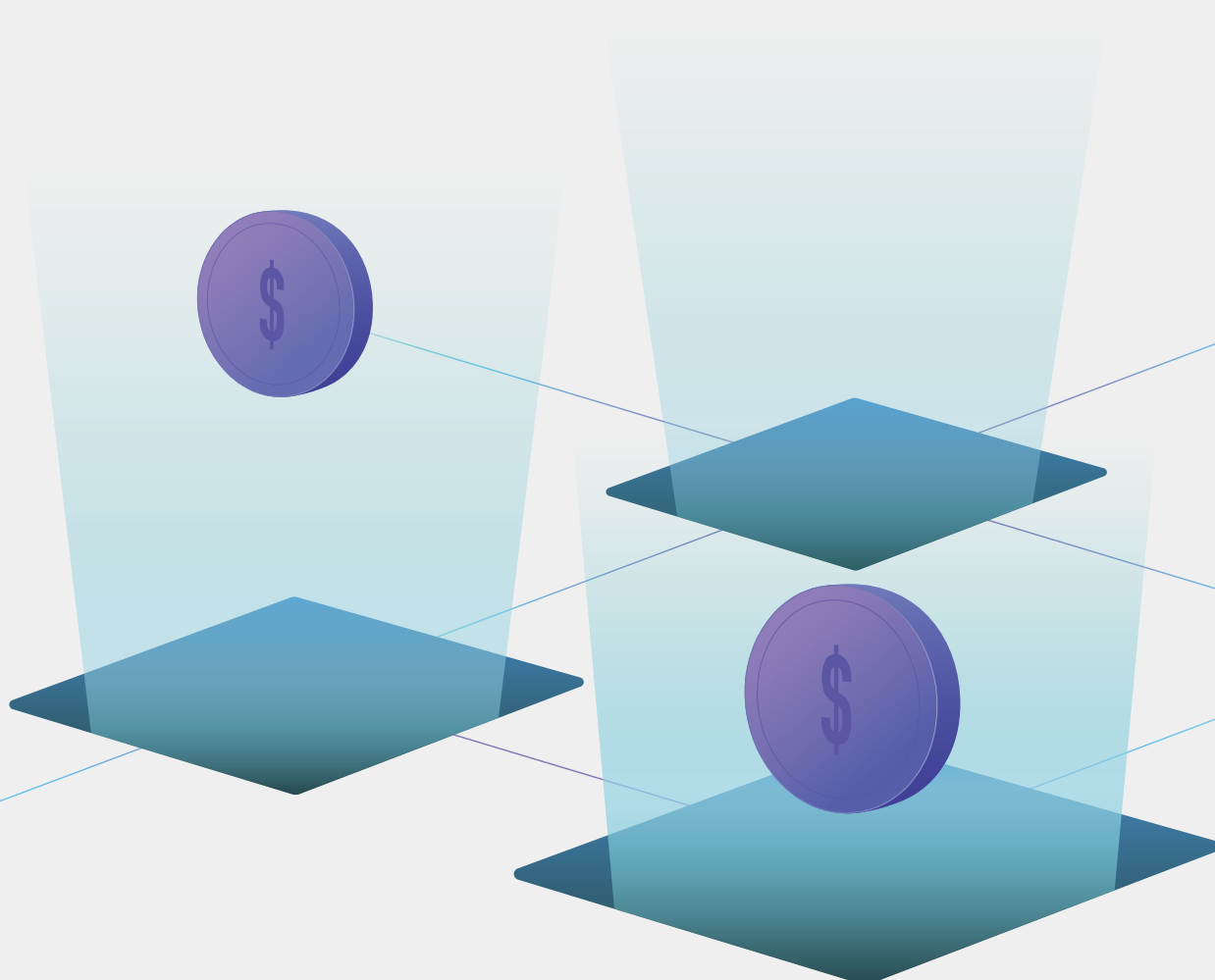
Lending and funding so far have been nothing but cashing on the credit of an individual's credit history. To borrow or invest, an investigation into the credit of the target individual is required. Since the investigation process is often not straightforward, it is often difficult to make both loans and investments. If a scoring service were available to all, individuals' trust could be easily verified. People who have not been able to

participate in financing and investment could participate as well. Also, if a loan or investment system using blockchain tokens were to be put in place, P2P loans and investments would become more accessible. As a result, it would become easier to finance and invest, and even do so across borders. Also, by storing the loan/investment conditions as smart contracts on a blockchain, the loan/investment process becomes more transparent and safer.

## 5-7. Asset tokenization

Alre aims to visualize the value of individuals through tokens. As assets are tokenized, different asset types can be exchanged in real-time. There are many types of assets, such as real estate, art, and securities, but there is currently no platform that can handle them with a single interface. We believe that by tokenizing various forms of assets, the assets can be used as a form of "money", and economic activities

can be further encouraged. For example, you could get insurance by tokenizing a car you own and staking a part of it, or sell art by tokenizing it while it remains on display. Also, since one large asset can be subdivided and owned by multiple people, it is possible to lower the barrier to investment and encourage larger markets.



# 6. ARCS token details

## 6-1. Overview

ARCS is the native token in the Alre ecosystem. It is issued on the Ethereum network with the ERC-20 token standard.

## 6-2. Token specification

The ARCS token is issued based on the parameters shown in the table below.

Entity to issue tokens	IFA Co., Ltd.
Token name	ARCS
Token symbol	ARX
Total minted tokens	400,000,000 (400 million)
Issuing schedule	Issue all tokens at once
Number of decimals	18
Blockchain platform	Ethereum
Token standard	ERC20
Contract address	0x7d8DafF6d70CEAd12c6f077048552Cf89130A2B1v

## 6-3. Token distribution

The 400 million ARCS tokens are planned to be distributed as follows:

Amount	Percentage	Usage
100,000,000	25 %	Circulation in the market
80,000,000	20 %	Early Investors (with lock-up)
40,000,000	10 %	Protocol and Service Development
40,000,000	10 %	Marketing
40,000,000	10 %	ARCSTeam
100,000,000	25 %	Future Reserve

## 6-4.Token migration and swap

As the ecosystem grows with more users and transactions, it will be necessary to build a blockchain that can accommodate scalability, performance, and customization requirements. ARCS is initially issued on the Ethereum network to begin development and build the ecosystem. However, Ethereum will not be able to meet the requirements

at scale. Going forward, the team will design and build an Alre proprietary blockchain infrastructure which the ARCS tokens will later migrate to. During the migration, the token holders will have to swap from the ERC-20 token standard to Alre's new native token standard.

## 6-5.Risk factors for the token price

The cryptocurrency market is new to the world and still immature. Regarding the ARCS token that IFA issues, the following case can be considered a risk.

### When cryptocurrency trading is prohibited by law

Due to the nature of cryptocurrency, if cryptocurrency trading on an exchange is prohibited by law, the liquidity in the market may drastically decrease, which could cause large fluctuations in prices.

# 8-ROAD MAP

- 
- July 2017 ■ AIre concept born
  - Research begins
  - April 2018 ■ AIre project starts
  - October 2018 ■ Satellite office established in Crypto Valley, Zug, Switzerland
  - March 2019 ■ AIre VOICE opens
  - Business alliance with Obyte announced
  - June 2019 ■ AIre VOICE wins at WBF 2019 Innovative Media Top 10
  - September 2019 ■ AIre concept announced for the first time at FINSUM
  - Participation in Blockchain Live 2019 in London, UK
  - Participation in Korea Blockchain Week, Seoul, Korea
  - October 2019 ■ Participation in Delta Summit, Malta
  - Participation in Blockchain Life, Moscow, Russia
  - November 2019 ■ White paper released
  - December 2019 ■ Listed on KuCoin

For the latest roadmap, please visit our official Medium page.  
<https://medium.com/arcs-arx-official>

# 9. Terms and conditions

This document was created for the sole purpose of providing information, and is not in any way, shape, or form an offer for selling stocks or securities nor is it a proposal, recommendation, or inducement of any other type of investment, and shall not be deemed as a document that proposes, promotes, or induces the purchasing of securities in any and all legal jurisdictions. The following terms and conditions ( herein after referred to as “the terms and conditions” ) are not submitted or registered in any jurisdiction or regulatory agency, and no considerations, confirmations, or plans of such kind are made by any regulatory agency. Moreover, the ARCS token ( hereinafter referred to as “the token” ) will not be given any ownership rights. Ownership of the token does not provide any ownership rights of ARCS to its owners, nor shall it provide any rights regarding equity, stocks, or rights pertaining to a similar product, rights to part of future revenues, IP rights, or any other property rights. Opinions from the community and feedback may be considered, but please understand that the token does not provide any rights for owners to influence the decision-making in the development process of ARCS.

## I. Objective

The issuing company of the token ( hereinafter referred to as “the company” ), the developers, and the overview of the token is as stated in sections 5 and/or 7. The token is not designed as a processing method of advance payments, e-money, cryptocurrencies, securities, commodities, or as any other type of financial product. Moreover, the company will reserve the rights to trade the token on a cryptocurrency exchange, but shall not bear any obligation to do so.

## II. The terms and condition’s scope of application

Unless explicitly stated in the terms and conditions, the terms and applications shall apply only to the purchase of the token from the company during the sales period. In the event that the development of ARCS succeeds in the future, the company or the developers may create a set of inner rules that include terms of use, relevant guidelines, and privacy policy (hereinafter referred to as “the ARCS terms and conditions etc.” ), and these terms, guidelines, and regulations may be updated regularly according to the correction process set forth in such terms etc. As of now, the private information of the buyers who have obtained the tokens during the token sales campaign will be handled in accordance with the whitepaper. Regarding the services to be provided through ARCS, if a contradiction or conflict shall emerge between the terms and conditions and the ARCS terms and conditions etc., the ARCS terms and conditions etc. shall be prioritized and applied.

## III. Rejection of cancellations and purchase applications

The purchasing of tokens from the company during the sales period shall be final, and other than in situations where it is obligated by the applicable laws or regulations etc., purchasers cannot request for a cancellation of a purchase or a refund. In consideration of the situation surrounding the token purchase, the company can reject applications to purchase tokens under its sole discretion or reserves the right to cancel such applications. The company shall not conduct sales of its tokens to residents of Japan, people with a Japanese address, or someone attempting to purchase tokens from a location in the country of Japan.

## IV. The process and specification of the token sale

The key clauses pertaining to the process and specification of the token sale (including but not limited to the date of sales, price settings, scheduled sales amount, expected revenue and its use etc.) shall be exactly as stated in section 5 of this document. By purchasing the token, the buyers agree that they understand the associated procedures and specifications and have no disagreements with it.

## V. The understanding and assumptions of the risks

Buyers understand and accept that risks stated in the following sections in regards to the purchase and ownership of tokens exists. If there are any questions pertaining to these risks, please contact us through the following website URL [<https://ifa-aire.co.jp>] By purchasing the tokens, buyers agree that they have a clear understanding of these risks and agree to them.



(a) No guarantee of revenue or profits

The revenue calculation examples used in this document are provided for the sole purpose for explanatory purposes and to show the industry average, and the calculation results do not guarantee that a profit can be made from following the market plan.

(b) The unpredictability of regulations

Blockchain-related technology is regulated by various regulatory agencies from across the world. The token may become limited in the functions of its system or its purchasing process. Moreover, the token may face regulation in its ownership like any other cryptocurrency.

(c) The token is not an investment

The token is not a public or legally binding investment of any kind. The objectives stated in this document may be amended due to unforeseen circumstances. Regardless of the success or failure of achieving all the goals stated in this document, the responsibilities of the token purchase shall fall upon the buyer or anyone in relation with the token purchase.

(d) The value of the token

While the token shall not be considered as an investment, there is a possibility that value will be added with the passing of time. Moreover, when the solution implemented in the ARCS is not actively used in actual society, there is a possibility that the value will go down.

(e) The risk of the loss of capital

Capital raised during the ICO process is not guaranteed. In case of a decrease or loss in value, there is no private or public insurance agent that the buyer can turn to for a solution, nor is there any private insurance that the company subscribes to.

(f) The risk of failure

In regard to the capital raised during the ICO procedure, the risk that the solution and the marketing activities conducted after that may end up in failure, and any other risk that arises out of conducting a business and held by other companies, shall apply to this business as well.

(g) The risk of using a new technology

While based on the ERC-20 token standard, original developments will be implemented with the ARCS crypto token. Adding to the risks stated in the document, there are additional risks that cannot be estimated. Such risks may appear in a form that is different from the ones stated in this document.

(h) The quantum computer

Technological innovations such as the development of quantum computers can pose a risk to encrypted communications that include ARCS.

## VI. Security

Purchasers shall bear the responsibility to come up with a logical solution to protect the secret keys and storing mechanisms of the wallets and vaults used when purchasing tokens from the company. If the secret key or any other credentials were to be lost, there is a chance that the purchasers may lose access to the tokens. The company shall bear no responsibility whatsoever for such loss.

## VII. Personal Information

The company may decide that it needs to obtain a certain amount of the purchasers' information at its own discretion, in order to follow the laws and regulations relevant to the sales of the token. In such cases, purchasers shall agree to provide such information upon request, and until legal and/or regulatory approval, to sell the token to the purchaser until after the above information is provided by the purchaser. The purchaser understands that the company may deny the sales or transfer of the token.

## VIII. Public charges

The financial amount of support and contributions shall all be tax exclusive. Purchasers shall personally bear responsibility for any and all taxation (consumption tax, sales tax, usage tax, VAT, etc.) to the financial support and contributions to the company. Moreover, the obligation to accurately deduct and collect the proper taxes, as well as the duty to report and pay the taxes to the appropriate taxation authority, shall also fall upon the purchaser. The company shall bear no responsibility for the deduction, collection, reporting, and payment of consumption tax, sales tax, usage tax, VAT, nor shall it bear the responsibility for the deduction, collection, reporting, and payment of taxes arising from any other support or contribution to the company.

## IX. Announcement and guarantee

- (1) By purchasing the token, the purchaser shall declare and guarantee the following:
  - (a) That they have thoroughly read and understood the terms of use (including all appendices).
  - (b) That they understand the terms of use, and they have a full understanding of the risks entailing the purchase of the token, as well as the token's functions, the transfer mechanism of crypto tokens, and any other important characteristics, the mechanism for storing tokens (token wallets etc.), blockchain technology, and blockchain-based software systems, and can evaluate the risks and influence arising from the purchase of the token.
  - (c) That they have obtained a sufficient amount of information relevant to the token, for the purpose of making informed decisions in regard to support from the token.
  - (d) That they understand that the token does not provide any rights in regard to ARCS or the company or associated companies in any shape or form. The rights that will not be provided to the purchaser includes voting rights, distribution rights, reimbursement rights, liquidation rights, rights pertaining to financial property (including any and all IP rights), and the rights pertaining to any other property as well as legal rights.
  - (e) That purchasers are buying the token to support the Alre ecosystem that will potentially be built. Purchasers understand that the token will not be purchased for the financial purpose including but not limited to investment, venture, or any other purpose.
  - (f) The purchase of tokens by purchasers shall abide by (i) the legal capability and any other threshold value regarding the purchase of the token and the signing of the contract with the company in the purchasers legal jurisdiction, (ii) limits in the regulation and exchange rate applicable to such a purchase, (iii) laws and regulations that include but is not limited to any government or any other applicable jurisdiction of the purchaser that may need to be obtained.
  - (g) Obligations under the tax law of the purchaser's legal area that arise out of the purchase of the token.
  - (h) When the purchaser purchases the tokens on behalf of a certain body, the purchaser has the right to agree to the terms of use on behalf of the body, and the purchaser or the body shall bear the responsibility of the breach of the terms of use by the staff or agent of the body (in this case, the "purchaser" in the terms of use shall refer to both the purchaser and such body).
  - (i) Purchasers shall not be residents of the country of Japan, nor should they have an address in the country of Japan, and must not have bought the tokens from such locations.
  - (j) Purchasers shall not be: (i) a resident of an area where access to the token is banned due to the applicable laws and regulations etc., or any treaties or administrative actions; (ii) is not a citizen, resident, or holds an address in a location facing sanctions or embargoes by sovereign countries including but not limited to the US; (iii) is not on er of revenue, or any other dealings in a temporary and an ongoing basis.
- (2) If the company violates any of the announcements or guarantees stated in the previous clauses, the company hereby expressly reserves the right to suspend, deprive, or take any other measure deemed appropriate at the sole discretion of the company to the purchaser's account.

- (2) If the company violates any of the announcements or guarantees stated in the previous clauses, the company hereby expressly reserves the right to suspend, deprive, or take any other measure deemed appropriate at the sole discretion of the company to the purchaser's account.

## X. Compensation

(a) Up to the maximum amount allowed by the applying laws etc., the purchaser shall be compensated, protected, and covered in and from: (i) the purchase and use of the token from the purchaser; (ii) responsibilities and obligations based on the terms of use; (iii) violations to the terms of use; (iv) the violation of the rights of any person or body and any demands, litigation, reparations, loss, costs, and legal fees (including lawyer costs) arising from such violations pertaining to the developers as well as the company, including the past, present, and future employees, board members, directors, contractors, consultants, shareholders, suppliers, sales companies, service providers, parent companies, subsidiaries, relevant companies, agents, the person in charge, the previous person in charge, the successor, and assignee (hereinafter the "the persons concerned of the company" ). (b) On the protection from various demands for compensation based on the previous section, the company reserves the right to unilaterally take action on this under the costs covered by the purchaser. This wording for compensation will be added on to the stipulation between the purchaser and the company, and will not serve as a replacement because of this.

## XI. Exception Clause

- (1) To the legally possible limit and as long as it is not stated in writing: (A) The token shall be sold "as is" and "within the limit of a providable amount" without any type of guarantee, and the company shall expressly deny any implied warranty of the token including but not limited to commodity quality, suitability for a certain purpose, and the rights as well as the innocuous implied warranty; (B) That there is no announcement or guarantee that the token is trustworthy, brand new, error-free, meets the conditions required by the purchaser, or a guarantee that the flaws in the token will be fixed in the future; (C) That the company cannot and will not announce or guarantee that the token and/or the delivery mechanism of the token is not infected by a virus or any other harmful components.
- (2) In the case that various factors lead to a situation where the token cannot be used, the responsibility for this loss shall fall upon the purchasing person or party that purchased the token, and the ARCS agrees to the party or person that it shall not bear any responsibility. After the issued date, the token shall not violate another person's IP rights, and the token shall be sent to the purchasing person or party without any explicit or implicit warranty.
- (3) Other than the previous 2 clauses, the company shall not bear any responsibility for damages arising from vis major and any other reason where the company cannot be blamed in any reasonable manner.
- (4) Since the exclusion of an implied warranty or the exemption of obligations to unwritten terms of use is not granted in certain jurisdictions, there may be instances where a part or all of the exclusion of an implied warranty or the exemption of obligations do not apply.
- (5) If the company violates any of the announcement or guarantees stated in the previous clauses, the company hereby expressly reserves the right to suspend, deprive, or take any other measure deemed appropriate at the sole discretion of the company to the purchaser's account.

## XII. Limits to responsibility

- (1) Up to the maximum amount permitted by the applying law,
  - (I) Under any circumstances, the company, and developers or the persons concerned of the company, shall bear no responsibility for any loss arising from or related to the sales or use of the token or any direct, indirect, special, accidental, inevitable, or derivative loss (including but not limited to loss of profit or revenue, use or loss of data, or loss attributed to the suspension of the business), regardless of the legal structure or of the contract or illegal activities (including but not limited to passive, active, or pertaining to simple loss), or any other legal or similar theories of enforcement (even if the person or party was notified on such possibilities of loss in advance or if it was possible to predict such loss) and,
  - (II) The total amount of the exclusive and/or mutual debt to be paid by the company and related developers or the persons concerned of the company, arising from the terms of use, the use or inability to use the token, shall not exceed the total amount the purchaser has paid regardless of contracts, warranties, or illegal activities (including passive, active, or pertaining to simple loss)

- (2) The limitations stated in the previous clause shall be applied to significant loss, fraud, or responsibilities arising from intentional or unintentional acts, and the applications of the clauses shall not be limited or excluded.
- (3) In certain legal areas, the limitation or expulsion of additional or consequential damages are not recognized. Therefore, part of the limitations of this article may not be applied to certain purchasers.

### XIII. Exemption

Within the maximum limit of the applying laws etc., purchasers shall exonerate the company and related developers or the persons concerned of the company from disputes between purchasers, and responsibilities, demands, requests, or loss (actual or consequential), whether they were known or unknown (including but not limited to statements of fault).

### XV. Miscellaneous provisions

In the case that the conditions, clauses, or regulations of the terms and conditions is deemed to be illegal, invalid, or impossible to execute, such conditions, clauses, or regulations can be separated from the terms and conditions, and shall not affect the validity or the possibility of execution of the remaining conditions, clauses, or regulations of the terms and conditions.

### XVI. Miscellaneous provisions

- (1) The terms and conditions shall be configured as a complete agreement between the parties on the main matters of the subject. Any previous contracts, deliberations, presentations, warranties, or conditions are consolidated within this document. Other than situations explicitly clearly stated within the contract, no stated or implied warranties, conditions, or contracts shall exist between the parties.
- (2) The company may change the contents of the terms and conditions to abide by the applying laws and regulations etc. When changes to the terms and conditions are made, the company shall release the amended terms and conditions on its website: <https://ifa-aire.co.jp>. The company may transfer any of the rights or obligations set out in the terms and conditions. Even on occasions where any of the rights or clauses of the terms and conditions were not executed, this should not be configured as an abdication of such rights or rights of such clauses. In situations where delays or nonfulfillment are due to reasons beyond rational control, the company shall bear no responsibility for any delay or nonfulfillment of obligations based on the terms and conditions. The purchase of tokens from the company shall not create any type of cooperation, joint venture, or any similar kind of relationship between the purchaser and the company. Other than in situations set out in the terms and conditions, the terms and conditions are intended only for the benefit of the purchaser and the company, and does not provide third-party beneficiary rights to any persons or body. The purchaser agrees and allows all contracts, notifications, disclosures, and any other announcements provided by the company to be delivered electronically.intended only for the benefit of the purchaser and the company, and does not provide third party beneficiary rights to any persons or body. The purchaser agrees and allows all contracts, notifications, disclosures, and any other announcements provided by the company to be delivered electronically.
- (3) While the ARCS aims to be a platform for investment activities, since it is not at a state where undetermined persons can freely buy and sell within the current scope of the plan, this shall not be considered as a “cryptocurrency” according to Japanese law, and we believe that it does not conflict with acts on settlement, financial instruments and exchange laws, or any other law since there are no direct dividends or the distribution of revenue. Moreover, if a possibility of a conflict with any laws were to arise due to changes in the regulatory environment, the necessary action shall be taken swiftly.

# 10. Revision history

Date	History
01/09/2019	Create draft version
15/11/2019	Create v1.0
7/5/2021	Create v2.0
21/5/2021	Create v2.1 (Updated Token Specification and Distribution)



