



**Advance capitalism to
the next stage by using
Blockchain Technology.**

“REACH, to the Future of this Planet.”

Richness cannot be measured by the amount of money.

If you can get anything you want, and if you can go anywhere you want to, is it enough?

You cannot feel “rich” without sharing your feelings with someone...

That is the reason why people support and cuddle each other.

Appreciate small happiness around us.

Then pass it to somebody next to you.

Somebody close to you,

Or somebody in the world, even if you haven't met...

If every person passes “ARIGATO” one by one,

Our future should be much richer...

We will hold richness that we haven't experienced yet...

With PEACE COIN.

Across borders and across the sea,

Reach, to the future of this planet.



GENERAL INFORMATION

** This white paper describes the initial token sale in which the PEACE COIN TOKEN PCE is sold. As explained in Use Case Chapter of this white paper, PCE is a Cryptocurrency which is designed to be used for various services provided by the PEACE COIN Platform. PCE can also be used as a mode of payment and to visualize a value such as gratitude to others and services, which were not visible in the past.

Please note that PCE is not intended to constitute a security in any jurisdiction, nor this white paper is a solicitation for investment or a collective investment scheme in any terms. This white paper and/or token sale is not pertain in any way to an offering of securities in any jurisdiction. The purchasers are advised to read this document carefully in full, and to seek advice from lawyers, accountants, and tax practitioner if necessary.

Purchases of PCE made by the purchasers are final and non-refundable, so anyone that would like to participate in the token sale should carefully weigh the risks, costs, advantages and disadvantages of acquiring PCE at their own responsibility.

LIMITATION OF THE PURCHASERS

At this stage, a citizen or resident (tax or otherwise) of any country or state where purchase of PCE or similar Cryptocurrencies may be prohibited, or the token sale itself is deemed to be not compliant with the applicable laws and regulations, are not eligible to purchase PCE via its token sale. Please note that if you are a resident of People's Republic of China, The United States and Japan, you will not be able to purchase PCE through the token sale.

At this stage, a citizen or resident (tax or otherwise) of any country or region where purchase of PCE or similar Cryptocurrencies which contains future possibility of gambling or unjustified sales promotion premium related usages may be prohibited are not eligible to purchase PCE via its token sale. And if PEACE COIN OÜ detects any purchase from a country or state where purchase of PCE or similar Cryptocurrencies are prohibited after purchase, the same amount of Bitcoin or Ethereum at the time of purchase will be refunded, and the purchaser is deemed to agree with that procedure.

Purchasers of PCE should have functional understanding of any mechanisms related to other Cryptocurrencies. PEACE COIN OÜ or any related entities, officers and employees thereof will not be responsible in any way for loss of any Cryptocurrency, including PCE, and/or fiat currency resulting from actions taken by, or omissions of the purchasers. Please refrain from purchasing PCE or participating in the token sale of PCE if you do not have required experience or expertise.

Purchasers of PCE should carefully consider the risks and other demerits of joining the token sale and acquiring PCE, and if necessary, obtain needed advice in this regard. You should not acquire PCE until you have received necessary advices, if you cannot accept or understand the risks associated with this token sale of PCE (including the risks associated with non-development of PEACE COIN Platform) and other risks mentioned in below clauses and/or within this white paper.

RISKS

****Make sure that all purchasers of PCE carry with its significant risks not limited to, but such as below. Prior to joining the token sale, you should carefully consider all the contents described in this white paper, and consult lawyer, accountant, and/or tax professional if necessary, before determining the purchase of PCE.**

- (a) PCE will be stored in third party Ethereum Wallet that supports ERC20 tokens, which can only be accessed with a password selected by the purchaser, and/or private (secret) key associated with the wallet account. Be sure to keep this information in a safe environment, safely storing the password and other information in multiple locations and well separated from their usual location, or else it may lead to the loss of PCE and other Cryptocurrencies. If your password is cracked or learned by somebody else, it may also lead to the loss of PCE.
- (b) The purchasers of PCE must recognize that some of the services, features, and/or technologies related to PEACE COIN Platform is currently still under development and may undergo significant changes in the future. You must acknowledge that any of these expectations regarding any functionality of our platform may not be met for any number of reasons.
- (c) The purchasers must be aware that while PEACE COIN OÜ will make best efforts to list PCE on major Crypto exchange around the world, it will depend on their judgement whether this may happen, and this may result in less liquidity than expected in the content of this white paper.
- (d) The purchasers should be aware that the value of PCE may fluctuate markedly and be reduced in its value, or become worthless by the occurrence of any event of Force Majeure as of any other Cryptocurrency. This may include (but not limited to) the balance of supply and demand, Cryptocurrency market situations, act of God; acts of government or governmental authorities, compliance with law, regulations or orders, fire, storm, flood, or earthquake; war (declared or not), rebellion, revolution, or riots, delay or failure of delivery from related company or person, strike, or lockout and technical reasons.
- (e) PCE will be issued on the Ethereum blockchain. As such, any malfunction or unexpected functioning of the ETH protocol may impact the purchasers' ability to transfer or securely hold PCE, which may affect the value of PCE.
- (f) The purchaser understands that while PEACE COIN OÜ will make best efforts to release the PEACE COIN Platform on time, it is possible that the official release may be delayed.

DISCLAIMER

To the maximum extent permitted by the applicable laws, regulations and rules, any entities of PEACE COIN OÜ and officers and employees thereof shall not be liable for any indirect, special, incidental, consequential or other losses of any kind, in tort, contract or otherwise (including but not limited to loss of revenue, income or profits, and loss of use or data), arising out of or in connection with any acceptance of or reliance on this white paper or any part thereof by you.

Any entities of PEACE COIN OÜ and officers, employees thereof shall not be liable for any case including but not limited to their failure to maintain or backup an accurate record of their password or password cracking by somebody due to their poor maintenance of their password after it is transferred to the purchasers.

Regulatory authorities are carefully scrutinizing businesses and operations associated to Cryptocurrencies in the world. Therefore, regulatory measures, investigations or actions may impact PEACE COIN OÜ's business and may limit or prevent it from developing its operations in the future. Any person undertaking to acquire PCE must be aware that PEACE COIN OÜ's business model or PEACE COIN Platform and its existing platforms may change or need to be modified because of new regulatory and compliance requirements from any applicable laws in any jurisdictions. In such case, purchasers and any person undertaking to acquire PCE need to acknowledge and understand that neither PEACE COIN OÜ nor any of its affiliate shall be held liable for any direct or indirect loss or damages caused by such changes.

This white paper and any other materials or explanations made by PEACE COIN OÜ and its officers and employees shall not and can not be considered as an invitation to enter into an investment. They do not constitute or relate in any way nor should they be considered as an offering of securities in any jurisdiction. This white paper does not include nor contain any information or indication that might be considered as a recommendation or that might be used as a basis for any investment decision.

Neither PEACE COIN OÜ nor any of its officers and employees are to be or shall be considered as advisor in any legal, tax or financial matters.

Acquiring PCE shall not grant any right or influence over PEACE COIN OÜ's organization and governance to the purchasers.

NO REPRESENTATIONS AND WARRANTIES

PEACE COIN OÜ does not make any representation, warranty or undertaking in any form whatsoever, including any representation, warranty or undertaking in relation to the truth, accuracy and completeness of any of the information set out in this white paper.

REPRESENTATION AND WARRANTIES BY THE PURCHASERS

By participation in the Token Sale of PCE, the purchasers represent and warrant to PEACE COIN OÜ as follows:

- (a) you are authorized and have full power to purchase PCE according to the laws that apply in your jurisdiction of domicile;
- (b) you are solely responsible for determining whether the acquisition of PCE is appropriate for you;
- (c) you are not acting as an agent on behalf of any other person or entity who wish to purchase PCE or participate in its Token Sale;
- (d) you have carefully considered the risks, costs, and any other demerits of acquiring PCE and understood such the risks, costs, and any other demerits associated with PCE and its Token Sale;
- (e) you are not acting for the purpose of speculative investment;
- (f) you agree and acknowledge that PCE does not constitute securities in any form in your jurisdiction;
- (g) you agree and acknowledge that this white paper does not constitute a prospectus or offer document of any sort and is not intended to constitute an offer of securities in your jurisdiction or a solicitation for investment in securities;
- (h) you agree and acknowledge that no regulatory has examined or approved of the information set out in this white paper, no such action has been or will be taken under the laws, regulatory requirements or rules of any jurisdiction and the publication, distribution or dissemination of this white paper to you does not imply that the applicable laws, regulatory requirements or rules have been complied with;
- (i) you agree and acknowledge that this white paper, the undertaking and/or the completion of the PCE Token Sale, or future trading of PCE on any Cryptocurrency exchange, shall not be construed, interpreted or deemed by you as an indication of the merits of PEACE COIN OÜ or PCE;
- (j) the distribution or dissemination of this white paper, any part thereof or any copy thereof, or acceptance of the same by you, is not prohibited or restricted by the applicable laws, regulations or rules in your jurisdiction, and where any restrictions in relation to possession are applicable, you have observed and complied with all such restrictions at your own expense and without liability to PEACE COIN OÜ;
- (k) you agree and acknowledge that in the case where you wish to purchase any PCE, it is not to be construed, interpreted, classified or treated as:
 - i. Any kind of currency other than Cryptocurrency;
 - ii. Debentures, stocks or shares issued by PEACE COIN OÜ

- iii. Rights, options or derivatives in respect of such debentures, stocks or shares;
 - iv. Rights under any other contract the purpose or pretended purpose of which is to secure a profit or avoid a loss;
 - v. Units in a collective investment scheme;
 - vi. Units in a business trust;
 - vii. Derivatives of units in a business trust, or any other security.
- (l) you have a good understanding of the operation, functionality, usage, storage, transmission mechanisms and other material characteristics of Cryptocurrencies, blockchain-based software systems, Cryptocurrency wallets or other related token storage mechanisms, blockchain technology and smart contract technology;
- (m) you are fully aware and understand that in the case where you wish to purchase any PCE, there are risks associated with PEACE COIN OÜ and its business and operations;
- (n) you agree and acknowledge that PEACE COIN OÜ is not liable for any indirect, special, incidental, consequential or other losses of any kind, in tort, contract or otherwise (including but not limited to loss of revenue, income or profits, and loss of use or data), arising out of or in connection with any acceptance of or reliance on this white paper or any part thereof by you;
- (o) you will not use the Token Sale for any illegal activity, including but not limited to money laundering and the financing of terrorism; and
- (p) all of the above representations and warranties are true, complete, accurate and non-misleading from the time of your access to and/or acceptance of possession this white paper or such part thereof (as the case may be).

UPDATES TO THE DETAIL OF THE TOKEN SALE

PEACE COIN OÜ reserves the right, at its sole discretion to change, modify, add, or remove portions of this white paper and the terms at any time during the sale by posting the amendment on the PEACE COIN website (<http://www.peace-coin.org>). Any purchaser will be deemed to have accepted such changes by purchasing PCE. If at any point you do not agree to any portion of the then-current version of this white paper and the terms, you should not purchase PCE.

MARKET AND INDUSTRY INFORMATION

This white paper includes market and industry information and forecasts that have been obtained from internal surveys, reports and studies, where appropriate, as well as market research, publicly available information and industry publications. Such surveys, reports, studies, market research, publicly available information and publications generally state that the information that they contain has been obtained from sources believed to be reliable, but there can be no assurance as to the accuracy or completeness of such included information. PEACE COIN OÜ has not conducted any independent review of the information extracted from third party sources, verified the accuracy or completeness of such information or ascertained the underlying economic assumptions relied upon therein. Consequently, any entities of PEACE COIN OÜ and officers and employees thereof do not make any representation or warranty as to the accuracy or completeness of such information and shall not be obliged to provide any updates on the same.

DEFINITIONS

PEACE COIN shall refer to, collectively or individually, PEACE COIN OÜ established under the laws of Estonia and its affiliates, including but not limited to the foundation planned to be established. PEACE COIN is a globally innovative company group in Blockchain industry with offices in Estonia and Japan, which links emotion to Token Economy providing trading and next-generation services powered by Blockchain technology.

PCE shall refer to the name of PEACE COIN TOKEN. PEACE COIN will open up its platform for all token issuers as an automated self-serving platform, for both initial Cryptocurrency issuance as well as a secondary exchange.

Base Currency shall mean the currency that you are buying or selling, e.g. Bitcoin, Ethereum, etc.

Cryptocurrency shall mean the cryptocurrency or the distributed ledger-based token.

Token Sale shall refer to the distribution of newly issued PEACE COIN TOKEN (PCE) based on the description of this white paper.

Soft Cap shall refer to the upper limit of a Token sold during the Token Sale, which the Token Sale could be terminated in the middle of the holding period at the Issuer's discretion.

Hard Cap shall refer to the maximum quantity of the Token Sale.

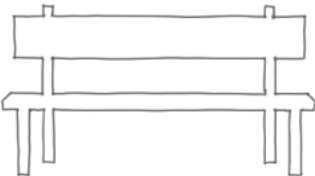
Whitelist shall refer to a list of qualified applicants who has completed both KYC verification and registration of their ERC20 address.

Registered ERC20 address shall refer to the address of a Wallet that is compatible with Ethereum based ERC20 tokens, that a Purchaser pre-registered in the Whitelist.

KYC shall refer to the "Know Your Customer" checking process, including identification verification based on the AML/CTF Rules (Anti-Money Laundering/Counter-Terrorism Financing Rules) based on the FATF (Financial Action Task Force) guideline, which will be conducted upon the Token Sale of PCE and by each Service Operators.

Contents

- 1. ABSTRACT11
- 2. BACKGROUND (Purpose of Development)13
- 3. TOKEN CONCEPT "ARIGATO CREATION".....18
- 4. TARGET MARKET AND MARKET SIZE21
- 5. USE CASE.....29
- 6. TECHNOLOGY.....35
- 7. ALGORITHM "Proof of Thanks"40
- 8. RESISTANCE TO MANIPULATION50
- 9. ROADMAP52
- 10. THE FOUNDATION.....55
- 11. FUNCTIONS OF THE WALLET.....57
- 12. FINANCE60
- 13. TOKEN-ISSUING COMPANY.....62
- 14. CONCLUSION64
- UPDATE HISTORY65
- APPENDIX 1. COMMENTARY67
- APPENDIX 2. COMMENTARY69
- APPENDIX 3. COMMENTARY71
- APPENDIX 4.73



1

ABSTRACT

1. ABSTRACT

PEACE COIN is a globally innovative project in Blockchain industry that links mental activities/emotions to Token Economy.

PEACE COIN is the distributed visualization platform for "the values that have not been evaluated in the past." And we are developing an incentive design with a new system called "ARIGATO CREATION", which enables to convey evaluation and appreciation for many values that cannot be measured by current systems such as Fiat Currency and GDP.

PCE increments by ARIGATO CREATION when used as payment for a value provider, which increases incentives to use the currency. Besides, it decrements when stored and not used, which enhances the circulation of the currency and galvanizes economic activities.

PEACE COIN aims to revitalize community economies in a wide range of communities including families, companies and local communities by providing Token with increment/decrement, and also to realize the visualization, monetization, and fluidization of "the values that have not been evaluated in the past", which is called Social Capital or Unpaid Work such as domestic labor, etc.

Through circulation of PEACE COIN, we strive for the realization of a "Rich Society which Accepts Diversity" where people have relaxed and rewarding lives, with smiles on their faces.



2

BACKGROUND

2. BACKGROUND Purpose of Development

Vision

"To Create a Rich Society that Accepts Diversity"

PROBLEM

In modern capitalism (based on credit creation), evaluation range is limited

1. **Sustainability** : Predicated on Economic Growth and Population Increase
2. **Concentration of Wealth** : Widening Disparity and Stagnation of Economy
3. **Invisibility** : Actions with Value cannot be Quantified and Assessed Fairly
4. **Non-Participation** : Some people cannot Participate in Economic Activities

SOLUTION

PEACE COIN will solve these problems by visualization, monetization, and fluidization of the values that have not been evaluated in the past

1. **Sustainability** : Token System Functions w/o Economic Growth, Population Increase
2. **Concentration of Wealth** : Token System which Values Money Circulation
3. **Invisibility** : New Value Standard to Visualize Goodwill
4. **Non-Participation** : Everyone can Decide and Participate in Economic Activities



BACKGROUND

It was in 2009 that the world's first Cryptocurrency, Bitcoin was invented. It can be said that Bitcoin has achieved the concept of "Democratization of Currency" as a government-independent currency. Then Ethereum implemented smart contract in Cryptocurrency and formed the concept of "currency + contract". Many other Cryptocurrencies with various concepts will be developed and they will create new economic zones. And the technologies such as blockchain, AI, IoT, etc. will be innovated and combined together, which may cause further breakthrough to Cryptocurrencies. We are now in the middle of the revolution of monetary economy.

Here we would like to think about the initial meaning of the monetary economy. The functions of money are to measure, to exchange, and to preserve the value, and the monetary economy is a system that forms society by

the functions of money. Historically, money has functioned as a bond of debt, and has changed its form from stones, shellfish, precious metals to bank notes. As the monetary economy developed, the society changed into capitalism which is based on money.

More than 150 years have passed since the capitalist society began. Civilization has been dramatically advanced during this period. The world became more convenient and wealthy, with growing population and increasing life expectancy. However, the present capitalism can be a system that polarize the world, between the rich and the poor. In modern society, only about 1% of the population holds about 50% wealth worldwide. It is obvious that advanced capitalism will make the rich people richer, and the poor people poorer. People are influenced by the psychological anxiety, and tend to accumulate wealth; some people hoard too much to spend. On the other hand, people in underclasses who need money to live their daily lives are pursuing responsibilities of politicians and capitalists, which strengthen the conflicts between them.

This is not a matter of capitalists, but fundamentally a matter of the mechanism that gives first priority to profits. It seems that the system of capitalism with credit creation based on GDP growing society is facing the limit. If we are going to advance the system of capitalism one step forward, it should be necessary to shift gradually from the idea of monopolizing to the idea of sharing.



PROBLEM

In credit creation, new value is created when someone borrows money. Credit creation was a convenient system to deliver money as a lubricant that creates new works for an immature society. However, in a mature economic environment, the loan is repaid, which cancels out the value created by credit creation. A system to grow over the long term in a matured society is required.

1. Sustainability

Modern capitalism is predicated on economic growth and population increase, and it is not adapted to mature economic environment. There are countries and areas that need to continue economic growth in the future, but some countries and areas do not need economic growth, so modern capitalism should proceed to next stage.

2. Concentration of Wealth

The concentration of wealth led to sluggish economic situation. It is a mechanism to give advantage to those who accumulated wealth, which means to evaluate people who stagnated the economic cycle.

3. Invisibility

It is very difficult to measure the values other than direct economic activities. It is easier to evaluate activities with outcome which can be quantified, such as sales activity in various organizations. However, the values of many activities done by goodwill cannot be quantified. Therefore, the activities to earn money remain paramount, and the activities with goodwill are neglected.

4. Non-Participation

In contemporary capitalist society, activities to earn more wealth are valued. Therefore, the actions to generate profits are evaluated, funds and human resources are invested to them, and money spreads to the activities to produce high-quality goods cheaply, that is to say, quest for efficiency. In an economic zone where value is

obtained only by money, money doesn't flow to Unpaid Work such as domestic labor, which limits the number of people who participate in the economic activities in the society.



SOLUTION

PEACE COIN is designed to increment by using and decrement moderately by being stagnant (for details, see Chapter 3 ARIGATO CREATION).

1. Sustainability

Even it is not based on population increase and economic growth, total amount of Token distribution will increase as more connections and exchanges occur between people in a community. It is a sustainable Token system that stored, stagnant or unused Token without transaction will decrement.

2. Concentration of Wealth

The amount of possessed Tokens will increment/decrement by ARIGATO CREATION according to the ratio of consumed Tokens to the amount of possessed Tokens. Therefore, it is designed to motivate to use the Token than to store the Token. PEACE COIN is suitable for payment, which circulates the Token well and prevents from over-concentration.

3. Invisibility

It is better to use the Token than keeping them, so users will look for the opportunities to use the Token actively. The Token will circulate in various places with visualization and monetization of Unpaid Work, such as contributions at home, in a company, or in a region, which has not been monetarily valued so far.

4. Non-Participation

The Token flows to Unpaid Work that money has never reached so far, and the Token is suitable for use, Token holders will have relationship to many people actively to use the Token.

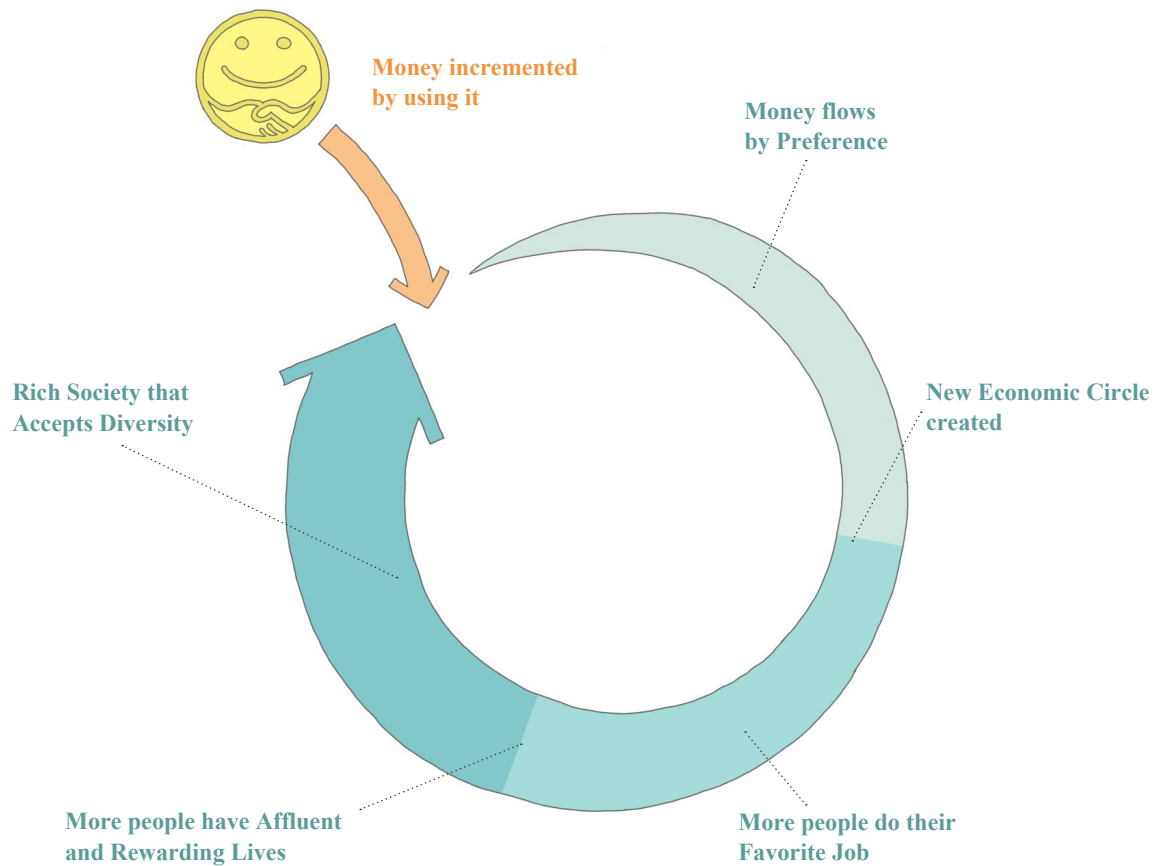


PEACE COIN aims for "Money Circulates by Thanks"

Originally, currency was created for smooth exchange of values in a society. It was a tool to facilitate human relationship smoothly, paid as an appreciation for someone doing something which they cannot do by themselves. Currently, the role of currency for achieving economic growth is emphasized. This causes problems such as concentration of wealth and neglect of invisible values. So returning currency to original function again shall make people feel secure and motivated in good relationship with other people, supporting and living with each other.

If there is not enough money for living, people tend to be more self-centered and short-sighted, then they might focus on buying cheaper things rather than paying attention to environment or health. However, if you gain additional money by using it, most of you might make a different choice.

The money that increments when used will naturally flow to the consumption of users' favorites, rather than efficient goods and services (although they are within the range of incremented amount). The money flow different from the past will create new economic zones. In those economic zones, payment will be done with new value standard, there will be more opportunities to do your favorite jobs with pride, and more people will have "comfortable and motivated" lives. It will make affluent lives and society, and children will be able to imagine the rich and bright future. This is how the development for "a Rich Society that Accepts Diversity" begins.



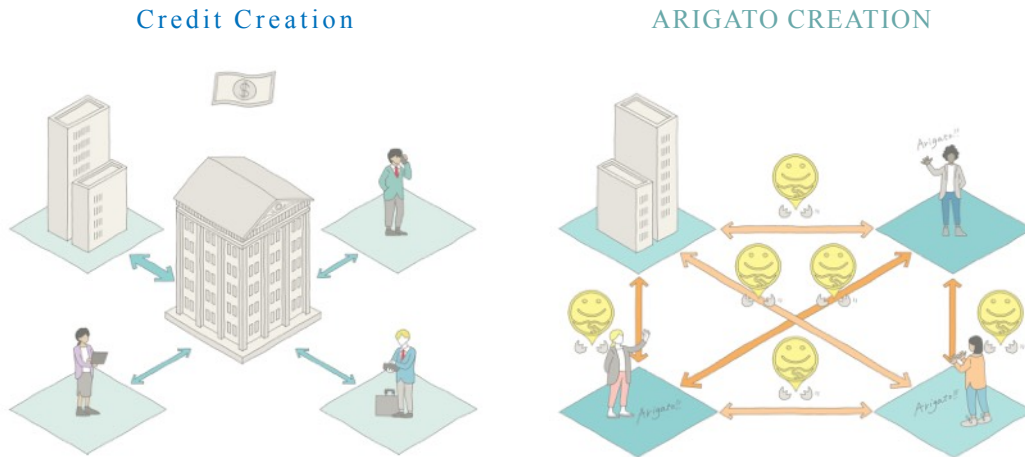
Our definition of “a Rich Society that Accepts Diversity” is a society in which people have affluent and meaningful life and peaceful smiles, and they recognize the differences of each other. PEACE COIN proposes a development project linked to EQ for the creation of a new economic system that is not based on GDP growth, adopting advantages of modern financial system.

3

TOKEN CONCEPT “ARIGATO CREATION”

3. TOKEN CONCEPT "ARIGATO CREATION"

"ARIGATO CREATION" is a system that the distribution amount of Token is adjusted by decentralized algorithm.



Credit Creation

Money is generated by financial institutions when someone takes a loan, and the amount of money in circulation throughout the market increases. The person who takes a loan aims for profits more than debt interest with the premise of growth of markets and industries.

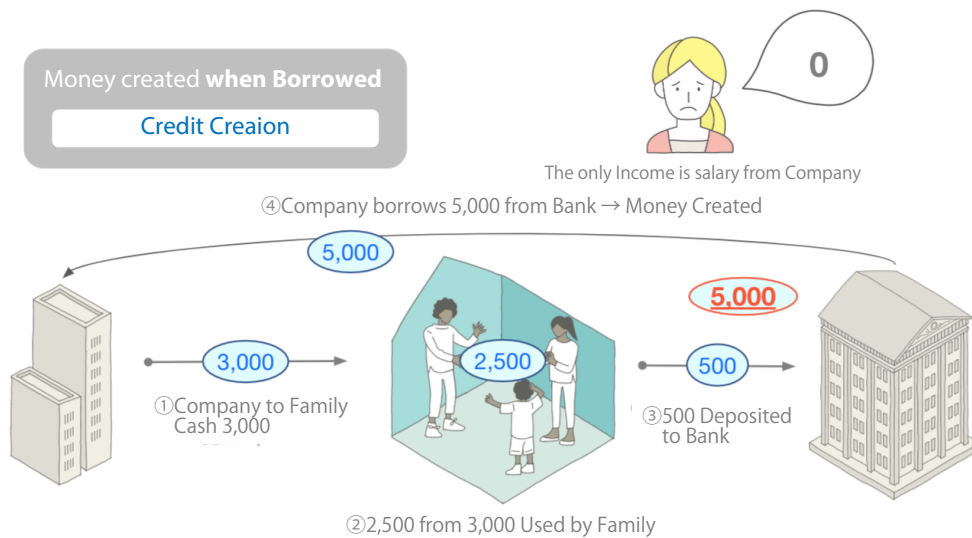


Figure 3.1: The Circulation of the Currency by Credit Creation



ARIGATO CREATION

Token is generated when you use it. Compared to credit creation, the increment amount at one time is little, but every individual who consumes goods and services can increase the distribution amount of the Token even in the market without growth.

※Increment will change according to the ratio of consumed Tokens to the amount of possessed Tokens. For details, please refer to Chapter 7.

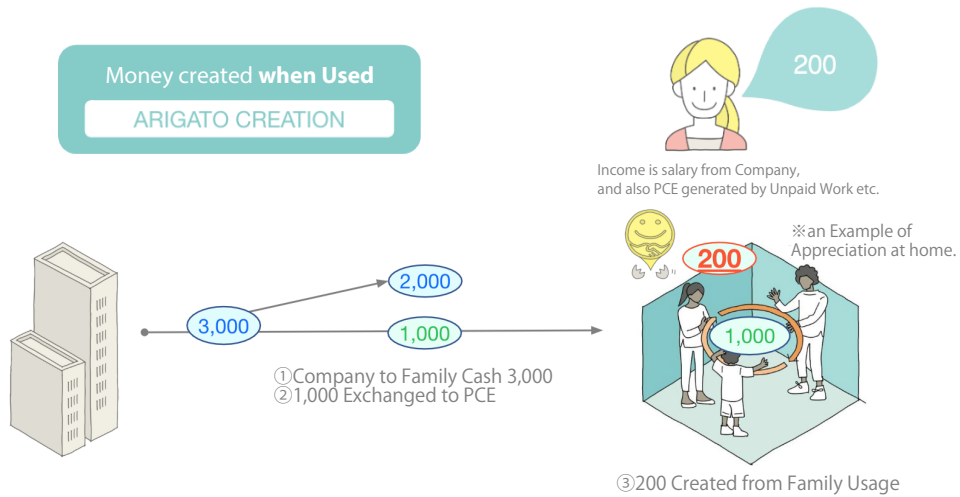


Figure 3.2: The Circulation of the Currency by ARIGATO CREATION

Our expenditure creates someone's work and livelihood. In this meaning, purchasing something creates someone's work. Not only the person who receives goods and service would appreciate, but also someone who receives remuneration would also appreciate. Expenditure cycle like this could generate "ARIGATO CREATION". "ARIGATO CREATION" is not centralized, and the distribution amount of PEACE COIN is determined by the algorithm, Proof of Thanks. The amount of PEACE COIN circulation will increase as the value exchange among people increases. And depending on the usage of PEACE COIN for each user, it will decrement if not used or being stagnant. The distribution amount will be determined in a democratic manner, and the balance will be adjusted as you see in Figure 3.3 : Increment/Decrement Simulation.

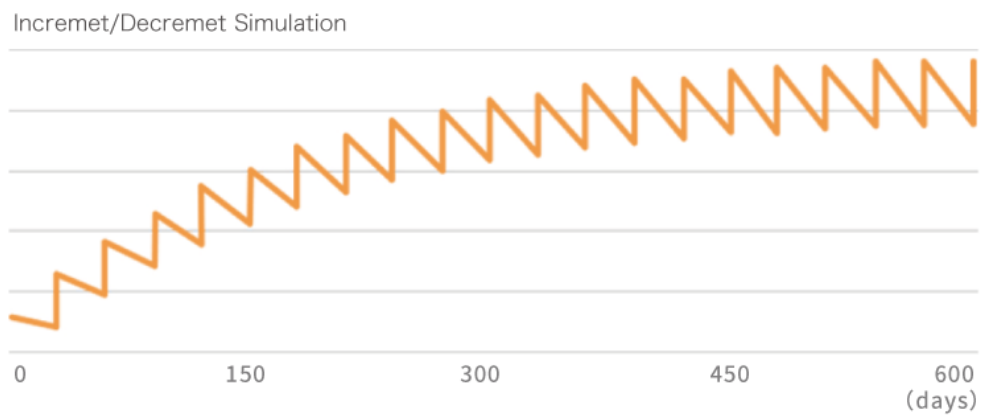


Figure 3.3: Increment/Decrement Simulation
(Increments 10%/month, Decrements 1%/day)

4

TARGET MARKET AND MARKET SIZE

4. TARGET MARKET AND MARKET SIZE

Fiat Currency of the Whole World	90.4 trillion USD
Cash Market	36.8 trillion USD
Stock Market	73 trillion USD
Gold Market	7.7 trillion USD
Crypto Currency	340 billion USD
Bitcoin	130 billion USD
Ethereum	64 billion USD

Figure 4.1 : Market Size

Reference OECD,IMF,Ministry of Internal Affairs and Communications 2018
PEACE COIN OÜ created the list based on the data from CoinMarketCap June 2018

Compared to those markets shown in Figure 4.1, Cryptocurrency market recorded about 820 billion USD in January 2018, and the future market growth is still expected.

Followings are the examples of the market not yet visualized, monetary valued, and liquidated.



Domestic Labor

The time for domestic labor in each country is listed in Figure 4.2 below, and the number of countries where women engage in domestic work for longer time than work is 25 among 26 countries, and the number of countries where the total time of work and domestic work of women is longer than men is 22 out of 26 countries. The average hours for domestic labor in OECD countries are: Men 857.75 hours/year (141 minutes/day), and Women 1,660.75 hours/year (273 minutes/day).

It is speculated that most people does not receive money as consideration of domestic work. In Figure 4.3 below, the compensation for domestic work in Japan is calculated by 3 patterns of method/approach; the Opportunity Cost Method, and the Replacement Cost Method (Specialist Approach / Generalist Approach), which shows the consideration should be approximately 1.4 million to 1.9 million yen per year.

Daily Work and Housework Time (minutes)

Country	Male		Female		Country	Male		Female	
	Work	House work	Work	House work		Work	House work	Work	House work
Australia	248	172	128	311	Mexico	368	113	161	373
Austria	307	135	195	269	Netherlands	236	163	122	273
Belgium	202	151	125	245	New Zealand	279	141	160	264
Canada	268	160	201	254	Norway	251	184	185	215
Denmark	211	186	147	243	Poland	234	157	136	296
Estonia	264	169	198	288	Portugal	300	96	179	328
Finland	199	159	159	232	Slovenia	236	166	169	286
France	173	143	116	233	Spain	280	154	195	258
Germany	222	164	134	269	Sweden	268	154	212	207
Hungary	261	127	171	268	Turkey	282	116	73	377
Ireland	280	129	142	296	England	259	141	169	258
Italy	191	110	90	290	America	253	161	192	248
Japan	375	62	178	299	OECD Average	259	141	158	273
Korea	282	45	167	227					

Figure 4.2 : Work and Housework Time List

Reference: OECD (2014) Balancing paid work, unpaid work and leisure (PEACE COIN OÜ created the list)

Evaluation Method	Calculated Value (Annual)	Explanation of Evaluation Method
Opportunity Cost Method	1,928,000 JPY	A method of evaluation based on lost profits (wages lost by not being able to provide labor to the market because of domestic unpaid work). Evaluated from the viewpoint if you replace the time of domestic labor with labor outside, how much you can earn.
Replacement Cost Method, Specialist Approach	1,565,000 JPY	A method of evaluating unpaid work done by household based on the wages of professionals engaged in the production of similar services in the market. Evaluated from the viewpoint if you ask specialists for each kind of domestic labor, how much it costs.
Replacement Cost Method, Generalist Approach	1,422,000 JPY	A method of evaluating unpaid work done by household based on the wages of a household employee. Evaluated from the viewpoint if you ask one household servant to do all domestic labor (within the service), how much it costs.

Figure 4.3 : Value of Domestic Labor

Reference: Cabinet Office Japan (2013) "Evaluation of Domestic Labor etc. Re-estimate by data of 2011" (PEACE COIN OÜ created the list)



Aging Society

As can be seen in Figure 4.4, the population ratio of elderly people (over 65 years old) in the world continues to increase. Above all, the aging in advanced countries and regions is remarkable, and the aged population ratio is expected to increase from 17.6% in 2015 to 26.6% in 2050.

The aging of Japan is the most rapid in developed countries, and the ratio of the aged population, which was 26.0% in 2015, is expected to reach 36.4% in 2050. As Japanese elderly people are highly motivated to work, among the labor force population (66.73 million in 2016), 4.5 million people are 65 to 69 years old (approximately 6.7% of the total workers in 2016), and 3.36 million people are over 70 years old (5.1% of the same). According to the Cabinet Office Edition of Annual Report on the Aging Society (2017), the proportion of people over 65 years old against the total labor force population reached 11.8%. The ratio continues to increase. In recent years, employment promotion for the elderly has become a policy issue because of the progress of aging and the necessity of securing the social security system.

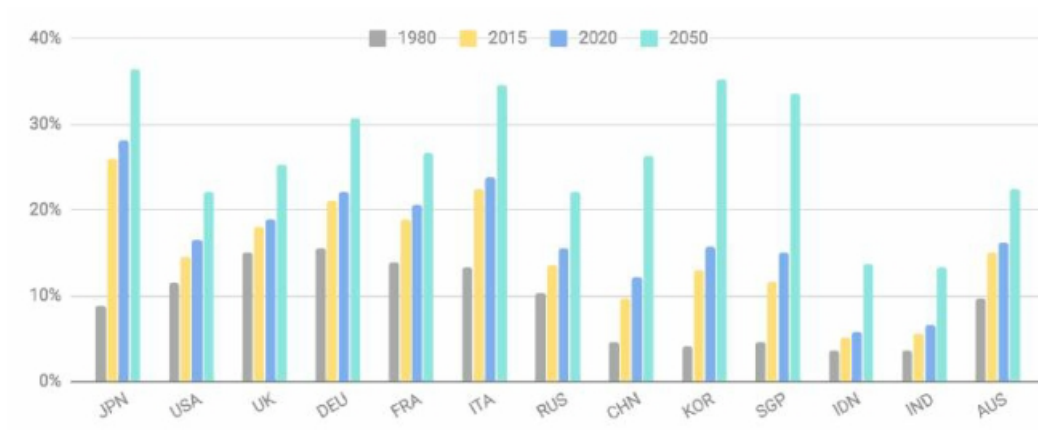


Figure 4.4 : Aged Population Ratio (Population of over 65 years old)

Reference JILPT (2018) "Databook of International Labour Statistics 2018"

(PEACE COIN OÜ created the figure)



Point System within Communities

The point market that visualizes and monetizes the values and engagements inherent in communities is growing.

In Japan, the human resource management market in 2016 was a market size of 4.1 billion yen, showing a substantial growth of 30.2% compared to the previous year. It is expected to reach 8.2 billion yen in 2021, and the introduction of SaaS type human resource management system is progressing rapidly.

The market size of common point service reached 1,797.4 billion yen in 2017 (based on the value of issued points). Furthermore, increasing number of companies are introducing point services, and there are more cases that one company participates in multiple common point services, which continuously expands the market and it is expected to reach 1.8884 trillion yen in 2018.



Figure 4.5 : Point Service Market Size

Reference Yano Research Institute Ltd.

"Trends and Prospects of Point Service and Point Card Market 2018"

(PEACE COIN OÜ created the figure)



● Communications	33.35%	954,249,600
● Finance	18.11%	518,210,676
● Trading and Investing	17.59%	503,354,136
● Commerce & Advertising	4.69%	134,098,400
● Payments	4.04%	115,575,329
● Mining	3.50%	100,000,000
● Drugs & Healthcare	3.12%	89,169,964
● Machine Learning & AI	2.99%	85,621,376
● Energy & Utilities	2.10%	60,000,000
● Data Analytics	1.99%	57,017,078
● Infrastructure	1.78%	50,980,000
● Compliance & Security	1.38%	39,544,101
● Privacy & Security	1.02%	29,092,221
● Data Storage	1.01%	29,000,000
● Supply & Logistics	1.01%	28,932,536
● Travel & Tourism	0.80%	22,934,006
● Identity & Reputation	0.76%	21,776,392
● Gaming & VR	0.67%	19,263,937
● Recruitment	0.08%	2,215,535

Figure 4.6 : ICO Category

Reference PEACE COIN OÜ created the list based on the data from

www.coinschedule.com/stats.html



Potential Market

As shown in Figure 4.6 above, few Cryptocurrencies focus on emotions like PEACE COIN, although numerous ICOs have been launched. Among those Cryptocurrencies, Bitcoin created a new concept of "Decentralized Currency," and Ethereum created a new concept of "Currency implemented contract function." In a similar way, PEACE COIN has possibility to create a new concept that focuses on the values for which we did not have evaluation criteria, such as Social Capital and Unpaid Work. A new economic zone can be created with the new concept.

PEACE COIN aims at visualization, monetization, and fluidization of the values which are not yet evaluated. Since not all values are linked to Fiat Currency, it is important to create new ecosystem within the PEACE COIN economic zone. According to Metcalfe's law which proves the value of a platform, the value of the PEACE COIN economic zone will increase in proportion to the square n^2 of the number of PEACE COIN users. There are more markets than described above, and various new businesses such as visualization of Social Capital are generated every day. We are going to promote partnership with platform companies with a remarkable affinity for us.

According to The Global Unicorn Club (www.cbinsights.com), 73% of the 126 unicorns (private companies with a corporate value of more than US\$ 1 billion) in the United States are platform companies (as of July 2015) and 31 out of 36 companies in Asia (21 in China, 9 in India) are platform companies. Currently, sales of the platform companies are less than 5% of the S&P500 companies. However, the increase of the net profit in the past 10 years is over 330%, so assuming that this trend will continue, it is possible to exceed 50% of the sales of S&P500 within 25 years. A platform company is the business model that approaches 0 marginal cost as it grows. They do not produce goods or software, nor do they carry stocks, but they are growing by forming communities. The networks within the communities have essential value to them, and it is required for them to strengthen the network connection of the communities.

Although there are no clear criteria for these markets since it is difficult to measure with GDP and they have not been evaluated in the past, there can be the domestic labor market, the point market, and many other markets as mentioned above. When you look at the long-term perspective, the central banks consider the inherent demands of each country. Therefore, it is assumable that there is a potential market size of about US\$ 36.8 trillion in the world.

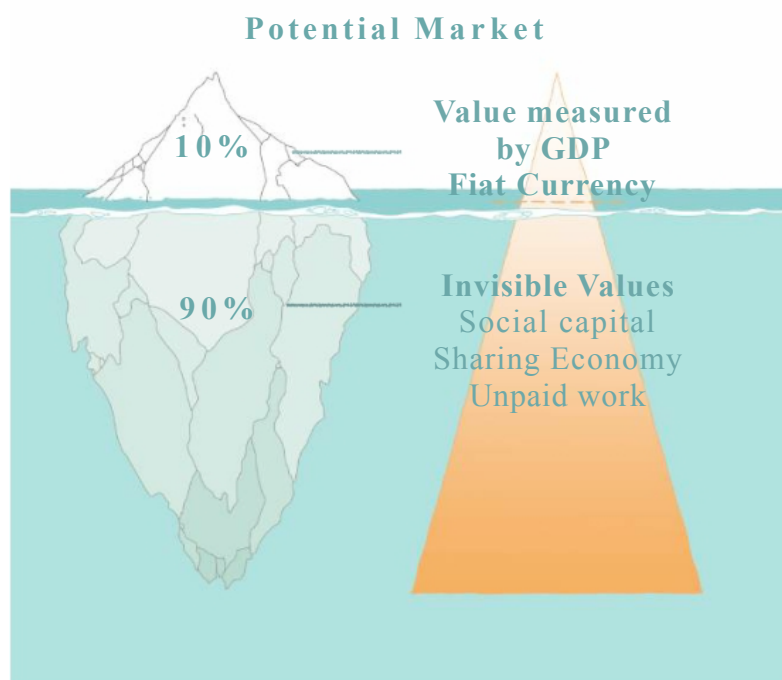


Figure 4.7: Potential Market



Trading in Free Market

PEACE COIN differs from Fiat Currency, which tends to be hoarded, and it visualizes the values that are often left out of the context of efficiency in capitalist society, such as social capital and unpaid work. For this reason, it is necessary to keep a certain distance from speculative markets and to have a limited connection with free markets.

In addition, from the aspect of utility as money, it is not desirable for the monetary value of PEACE COIN to fall sharply. Therefore, it is better for PEACE COIN to be issued by Proof of Thanks algorithm, based on users' activities, not setting the maximum issue limit like BTC. Since the number of PEACE COIN Token held (and not used) by all users will decrease at a certain rate, the amount of Token in circulation will not continue to increase unless the number of users continues to grow, which will not result in a virtually unlimited issuance. (*For details, refer to Chapter 7)



Market Price of PEACE COIN

Recently, several models have been proposed to analyze and forecast the market price of Cryptocurrencies. Among these, a model analyzes Bitcoin trading prices as time-series data, and reports that the efficiency of the Bitcoin market is increasing over time.[3] A similar analysis of time-series data on Ethereum trading prices confirms that the efficiency of the Ethereum market has increased over time.[6].

Metcalf's Law, formulated by George Gilder in 1993 [4], asserts that the value or convenience a user receives by using a telecommunications network (a group of interconnected nodes used to exchange messages between nodes) is proportional to the square of the number of connected users. In particular, it has been reported that Metcalfe's Law can be applied to the market price or trading price of Bitcoin. [1, 2, 5, 7, 8].

First, for each of Bitcoin and Ethereum, we estimated the relationship between the time elapsed since the start of trading and the number of active users using a model from the literature [8], and we estimated the relationship between the number of active users and the trading price using a generalized Metcalfe's Law. Next, we combined the Bitcoin and Ethereum models to predict the transition of the PEACE COIN trading prices over time, in light of the characteristics of Ethereum's no maximum limit on issuance, PEACE COIN's no maximum limit on issuance but users organically create a maximum limit through its algorithm, and Bitcoin's clear maximum limit on issuance. It is important to note that the only parameter required for the model is a maximum limit on the number of active users, which does not depend on specific characteristics of Bitcoin or Ethereum. Therefore, it is expected that the price trend of PEACE COIN can also be explained by versatile modeling methods.

Using these versatile modeling methods based on Metcalfe's Law, we created a model to forecast the trading price trends of Bitcoin and Ethereum, and based on the model, we considered the long-term forecast of the trading price of PEACE COIN (Figure 4.9)

Estimated Active Users (Figure 4.8)

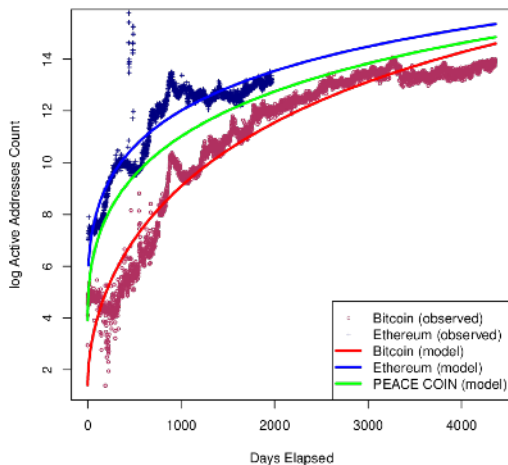


Figure 4.8 shows the results of forecasting the number of active users of Bitcoin, Ethereum, and PEACE COIN, since the start of trading. In Figure 4.8, the horizontal axis is the number of days elapsed since the start of trading, and the vertical axis is the natural logarithm of the number of active users. The red and blue dots represent the actual values for Bitcoin and Ethereum, respectively, and the red, blue, and green lines represent the predicted values of Bitcoin, Ethereum, and PEACE COIN, respectively.

Estimated Trading Price (Figure 4.9)

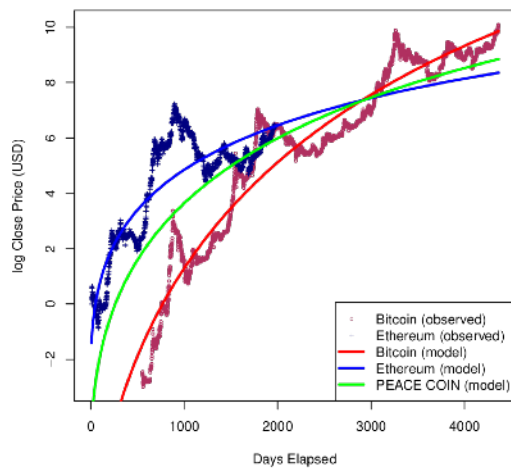


Figure 4.9 shows the results of forecasting the trading prices of Bitcoin, Ethereum, PEACE COIN, since the start of trading. In Figure 4.9, the horizontal axis is the number of days elapsed since the start of trading, and the vertical axis is the natural logarithm of the trading price. The red and blue dots represent the actual measured values of Bitcoin and Ethereum, respectively, and the red, blue, and green lines represent the predicted values of Bitcoin, Ethereum, and PEACE COIN, respectively.

Reference PEACE COIN OÜ created the list based on the data from Coin Metrics*1
 (Bitcoin : 1/9/2009 - 12/20/2020, Ethereum : 7/30/2015 - 12/20/2020)

*1 <https://network-charts.coinmetrics.io/>

Reference

- [1]Ken Alabi. Digital blockchain networks appear to be following Metcalfe's law. *Electronic Commerce Research and Applications*, Vol. 24, pp. 23–29, 2017.
- [2]Ken Alabi. A 2020 perspective on “digital blockchain networks appear to be following Metcalfe's law”. *Electronic Commerce Research and Applications*, Vol. 40, p. 100939, 2020.
- [3]Aurelio F Bariviera, María José Basgall, Waldo Hasperué, and Marcelo Naiouf. Some stylized facts of the Bitcoin market. *Physica A: Statistical Mechanics and its Applications*, Vol. 484, pp. 82–90, 2017.
- [4]Shapiro Carl and HALR Varian. *Information rules: A strategic guide to the network economy*. Harvard Business School Press, Boston, 1999.
- [5]Timothy Peterson. Metcalfe's Law as a Model for Bitcoin's Value. *Alternative Investment Analyst Review*, Vol. 7, No. 2, pp. 9–18, 2018.
- [6]Lukáš Pichl, Zheng Nan, and Taisei Kaizoji. Time series analysis of ether cryptocurrency prices: Efficiency, predictability, and arbitrage on exchange rates. In *Advanced studies of financial technologies and cryptocurrency markets*, pp. 183–196. Springer, 2020.
- [7]Ben Van Vliet. An alternative model of Metcalfe's law for valuing Bitcoin. *Economics Letters*, Vol. 165, pp. 70–72, 2018.
- [8]Spencer Wheatley, Didier Sornette, Tobias Huber, Max Reppen, and Robert N Gantner. Are Bitcoin bubbles predictable? Combining a generalized Metcalfe's Law and the Log-Periodic Power Law Singularity model. *Royal Society open science*, Vol. 6, No. 6, p. 180538, 2019.

5

USE CASE

5. USE CASE

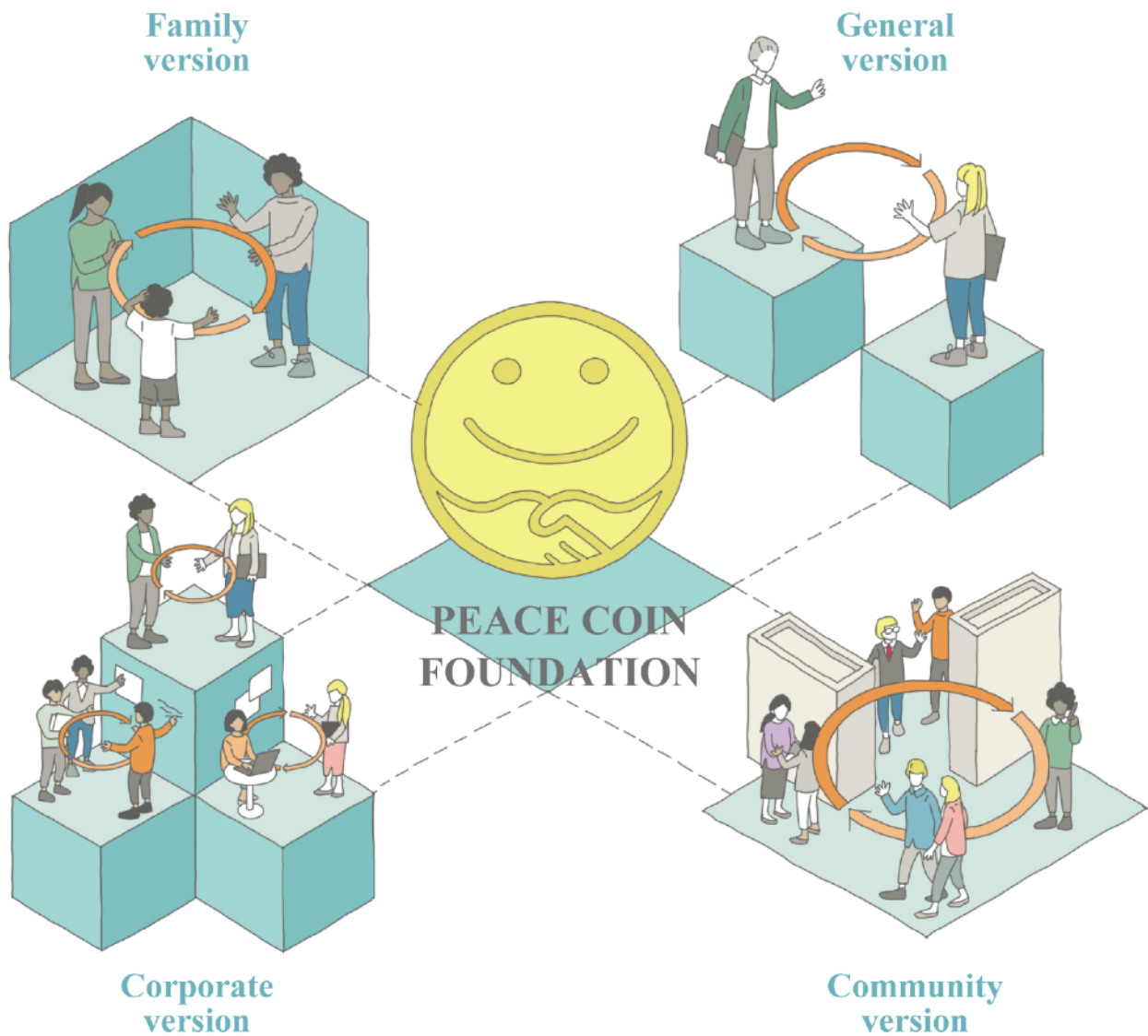
Based on the platform provided by PEACE COIN OÜ, PEACE COIN can be used as evaluation criteria or approval action for the behavior which was hard to be valued in terms of money. This can be introduced in a wide range of communities, from home to companies.

Furthermore, in a larger framework, it is expected to contribute to local creation once introduced to local communities.

Generally, PEACE COIN token will be introduced, but in case of companies and local communities, sub-tokens can be issued if necessary, and applied different operational conditions from the main PEACE COIN token.

The followings are use cases in various scales.

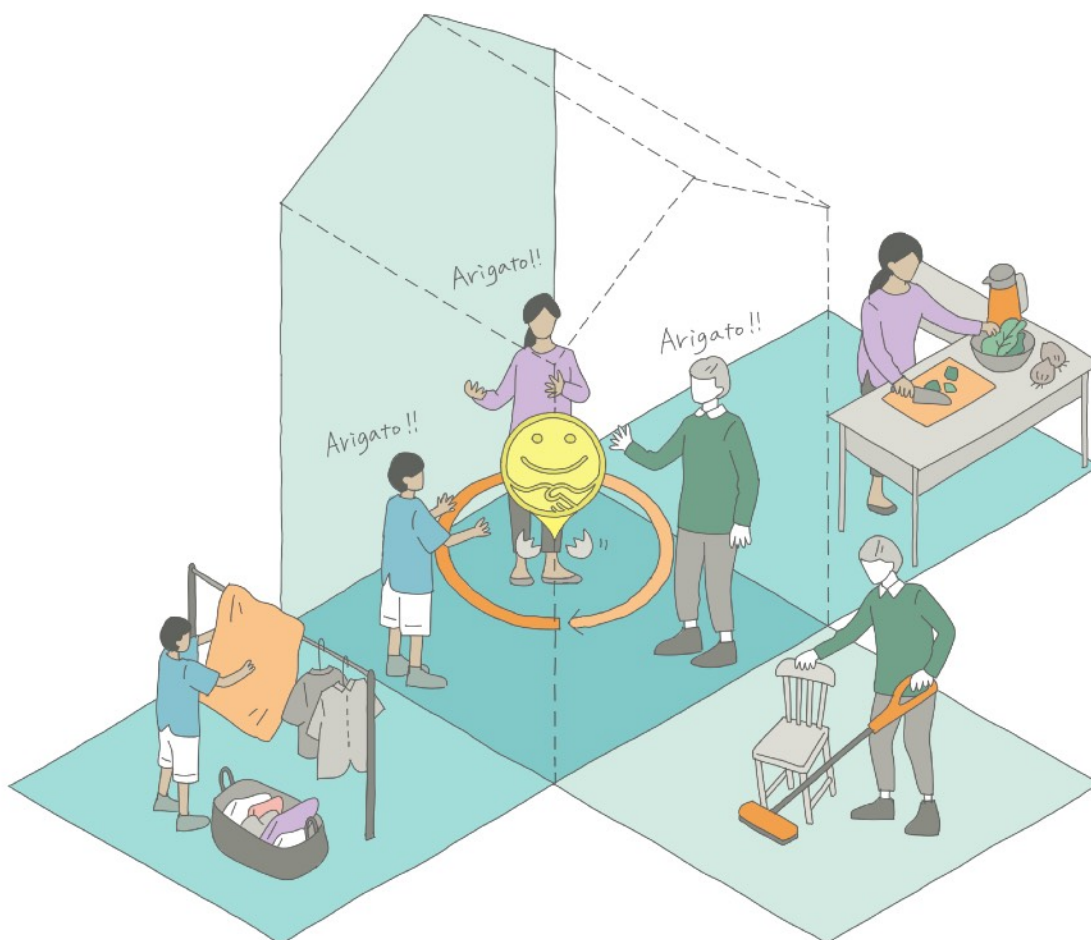
※3 use cases are introduced in this Chapter, and other possible use cases are described in Appendix 1.



01



Use Case 1 Utilization as Remuneration for Housework



Housework is difficult to be evaluated even though it is economically valuable services (Unpaid Work). If you pay PEACE COIN for those housework such as cooking, laundry, cleaning, childcare, caregiving etc. with appreciation, it will create a small economy. Furthermore, housekeepers and neighbors can pay PEACE COIN to each other when others support or help them, which will create more and more economies.

Visualization of Unpaid Work will be promoted by purchasing localized PEACE COIN token and evaluating housework between couples and families. We will promote development of applications and collaboration with platform companies.

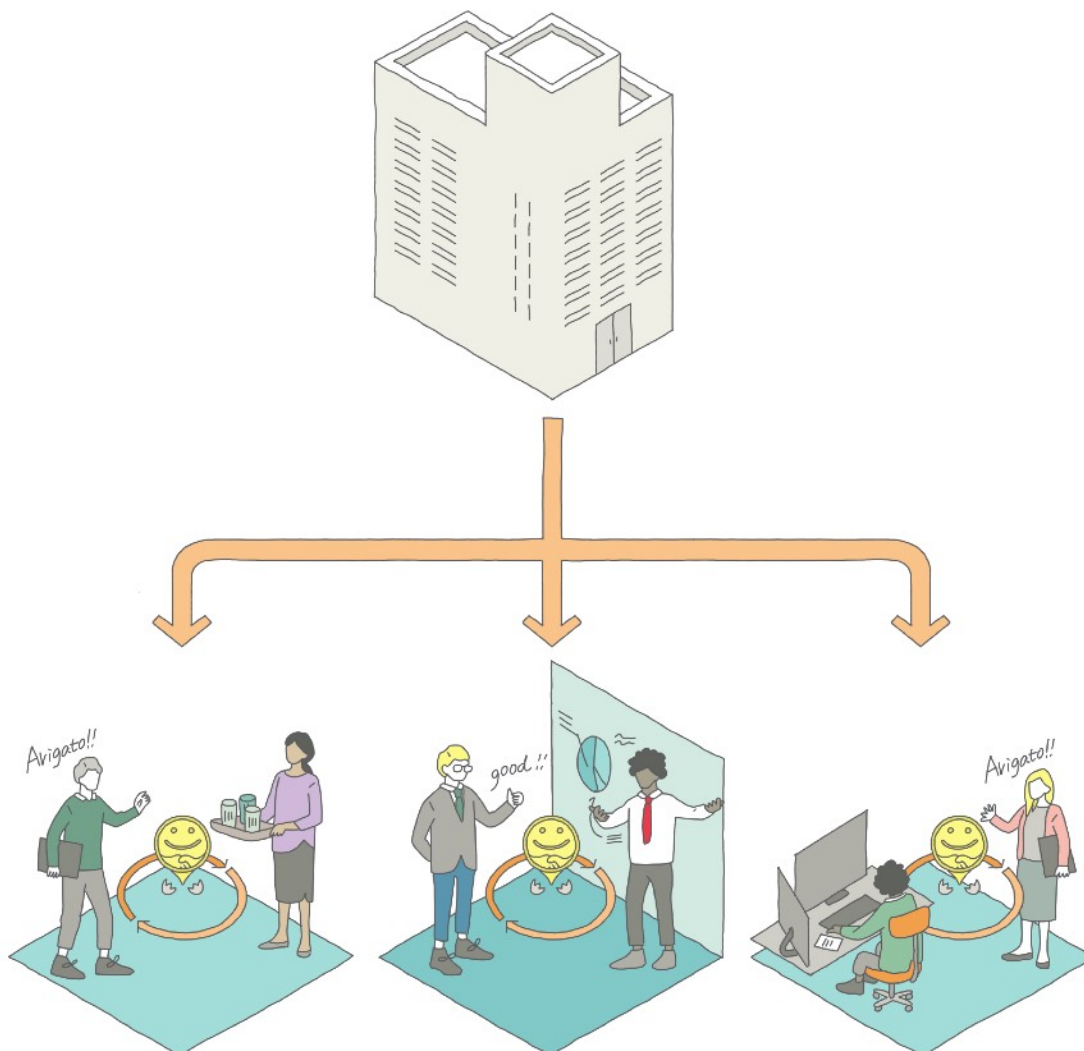
02



Use Case 2 Utilization in Corporate Personnel System

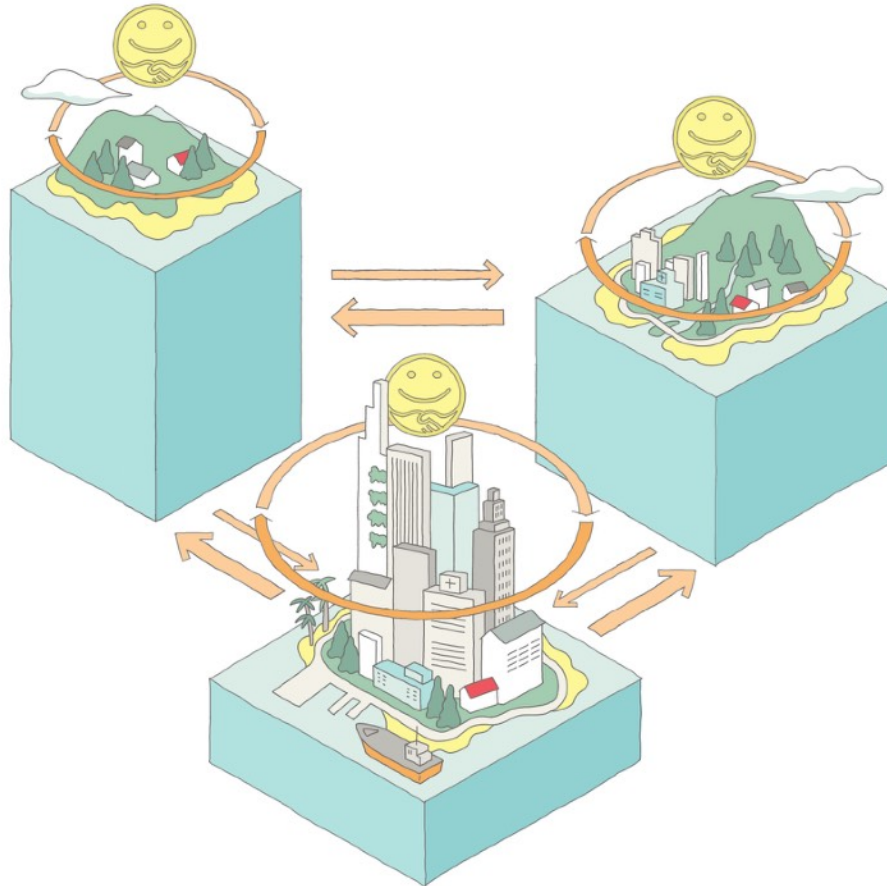
A company pays PEACE COIN to their employees as a part of their salary and remuneration. And employees can pay PEACE COIN to each other as an evaluation. This can be free evaluation which is not bound by the evaluation standard of the company. Employees who are not easily evaluated in the existing system will be spotlighted, such as employees who are doing their best but not yet achieved results, employees who are keen to work hard, or back office employees who are unlikely to be evaluated by results.

We will introduce the implementation of PEACE COIN remittance function to chat application such as Slack, or partnership with SaaS companies, etc. to the companies that are trying to promote employees' engagement, to visualize qualitative results, and to revitalize internal communication.



03

Use Case 3 Utilization as Community Currency



PEACE COIN has two aspects; it strengthens the connection of communities by circulating the incremented money with "ARIGATO CREATION" to the values not being visualized (LETS*) and it accelerates the currency's circulation speed by decrement function (Stamp Money*). In addition, for usual banknote type Community Currency, security costs such as countermeasures against free riders will be expensive as the value of Community Currency increases, but fraud is extremely difficult with PEACE COIN as it is based on Blockchain.

Upon introducing Community Currency, the increment/decrement rate suitable for each region will be set by algorithm so that each Community Currency can be exchanged at a constant rate. As regions with high population have more opportunities to use Community Currencies, we can set the increment rate low, which will increase the value of the currency. On the other hand, regions with low population have less opportunities to use Community Currencies, we can set the increment rate high so that the amount of the currency will easily increase (but the value of the currency decreases).

Connecting the global PCE with Localized Tokens for local communities will enable users to exchange currencies throughout the PEACE COIN platform. Thus PCE liquidity will be ensured not only within the region but also across a widespread area.

Currency Type	Characteristics	Control System	Advantage	Disadvantage
Fiat Currency	Banknote Type. Central Bank is the issuing entity. Money is created by Credit Creation.	Centralized Control System	Savings available. Widely distributed.	Limited in scope of target value. Widening disparity in wealth.
LETS*	Bankbook Type. Initial account balance of a user is 0. "-" is marked in your account when you receive service, and "+" is marked when you provide service. It aims to revitalize community by people helping each other.	Mutual Credit Issuance System	Enhancing community relationship. Transactions can be done between Individuals without intervention of Value Issuer.	Troublesome transactions with recording. Free Rider problem.
Stamp Money*	Banknote Type. A system to decrease the value of money as time passes, by buying a stamp of a certain % of the face value and paste it on the back of the bill periodically.	Centralized Control System	Promoting Economic Revitalization. Easy to issue.	High risk of Forgery
PEACE COIN	Electronic Currency. It increments when paid to a value provider, and decrements when stored and not in use.	Decentralized+ Mutual Issuance System	Various Values can be measured. High Fluidity. Impossible to forge. Enhancing community relationship. Promoting Economic Revitalization.	Not suitable for Savings.

※Please refer to Appendix 2 "Comparison of Community Currencies " for details.

6

TECHNOLOGY

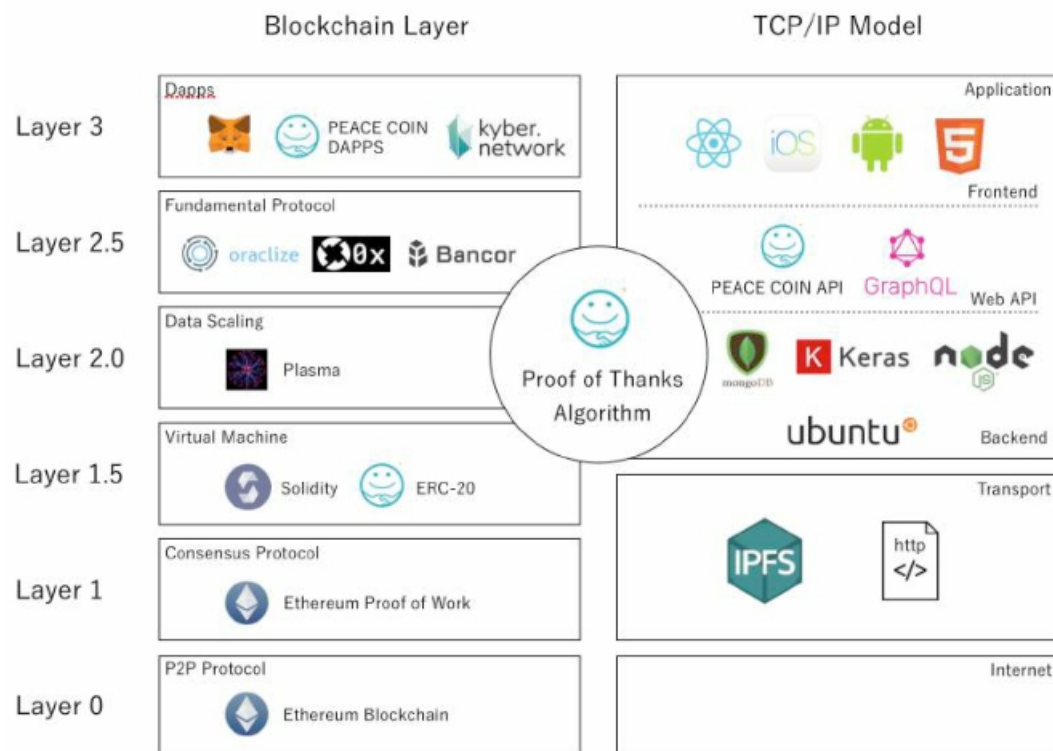
6. TECHNOLOGY

Explanation may be unnecessary, but since Blockchain is “distributed ledger”, it is highly transparent and extremely robust technology as data falsification is significantly difficult by combining encryption and consensus algorithm. Since data is stored in all nodes, data will not be deleted until all nodes are ceased. And it actualizes zero downtime, as each node is distributed, logically the network will never stop as long as all nodes are not destroyed at the same time. This Blockchain technology is the fundamental element of PEACE COIN which aims to create new eco-system for “Rich” society. Approval work for building blocks is only available to users who owns PCE in their PEACE COIN Wallet. On the Blockchain, the data of how PCE coursed through (we define it as “Thanks”) is stored, which is the record of how emotion and economy combined with PEACE COIN.

PEACE COIN will select which Blockchain we adopt, depending on our financial arrangements. The algorithm of PEACE COIN Token is planned to be implemented on Ethereum Blockchain, but may be combined with a private Blockchain hard-forked from other Blockchain. And we plan to develop our original PEACE COIN Blockchain in the future.

6.1 Technology Stack

In PEACE COIN architecture, the Blockchain technology and TCP/IP model are respectively layered, and technology building blocks are formed so that the technology adopted for each layer becomes loosely coupled. The technology of any layer can be substituted, which makes it possible to produce cost-effective service continuously at low price while improving quality for Blockchain technology that are changing rapidly.



6.2 Blockchain Layer

Layer 0 : P2P Protocol

Ethereum can structure Smart Contracts and ERC-20 Tokens as extended applications on its platform, which enables Turing-complete, specifications with fixed values, retention of the conditions and reference to Blockchains. Based on Ethereum, we will deploy highly scalable services.

Layer 1 : Consensus Protocol

The Consensus Protocol will be Ethereum based PoW. However, the technology stack of PEACE COIN will not rely on a specific technology for consensus-building protocols. Since Ethereum is scheduled to migrate to PoS, it is possible that we will choose to adopt our original Blockchain, depending on the future deployment of Ethereum.

Layer 1.5 : Virtual Machine

The programming run on Ethereum Virtual Machine is called Solidiy. PEACE CON is defined as an ERC-20 Token in this layer. As Regional Currency, Community Currency, and as Token to exchange values in potential economic zones, Tokens for each economic sphere that inherit functions from PEACE COIN will be generated.

Layer 2.0 : Data Scaling

Currently, the processing capacity of Blockchain depends largely on consensus protocol and processing capacity of the virtual machine on the Blockchain, and it is not enough as the world computer ideal for Ethereum. The problems of remittance processing speed, increasing handling fees, etc. are recognized as the scalability problem among the communities. For this reason, PEACE COIN adopts Plasma which can keep high speed and reduce handling fee as a countermeasure against the scalability problem.

Layer 2.5 : Fundamental Protocol

As it was in the early days of the internet, OSI model and TCP/IP protocol stack were created based on the HTTP protocol. These protocol stack were formed in Blockchain, especially in Ethereum, and ecosystems are emerging on Ethereum. We will make maximum use of these ecosystems in order to provide highly scalable services in the PEACE COIN economic zone. 0x is a protocol to realize a Decentralized Exchange, and it will provide a method to exchange values with PEACE COIN in the regional economies and the community economies by decentralization. While the Ethereum Virtual Machine maintains its internal condition, Oraclize enables to retrieve the external data into PEACE COIN Dapps by decentralization.

Layer 3 : Dapps

This is the layer that defines the decentralized application of PEACE COIN. This layer cooperates with the Application Layer of TCP/IP model to form a distributed application. From the viewpoint of current Blockchain situation, the server that centrally controls is still vital for the distributed applications. However, in the PEACE COIN project, each protocol, application and service will be loosely coupled and formed as a highly scalable application so that we can provide sustainable services with the latest technology.

6.3 TCP/IP Layer

Application Layer

For the sake of convenience, Application Layer is separated into Front-end, Back-end, and Web API Layer, and manages each technology stack.

Front-end

The Front-end of PEACE COIN is built on the Blockchain Layer and Web API Layer, and it can be built on multiple platforms. Each function is completely controllable from the Web API, and the object of the Front-end operates on various possible platforms such as iOS, Android, Chrome, Windows etc.

Web API

The function to operate PEACE COIN is provided by the Web API. If the secret key and the authority is transferred to the account, it is possible to build an application using the functions of Dapps, and the tools to construct the distributed applications will be provided by third parties etc.

Back-end

In the Back-end, we allocate nodejs and link with Smart Contracts and distributed applications through modules such as Web3. We use the technology that is the fundamental of conventional web applications, and develop an architecture which gives priority to usability. We also use TensorFlow or CNTK to analyze the big data such as value exchanges and message exchanges realized on the contract, and Keras, a high-standard neural network library executable on Theano.

Transport Layer

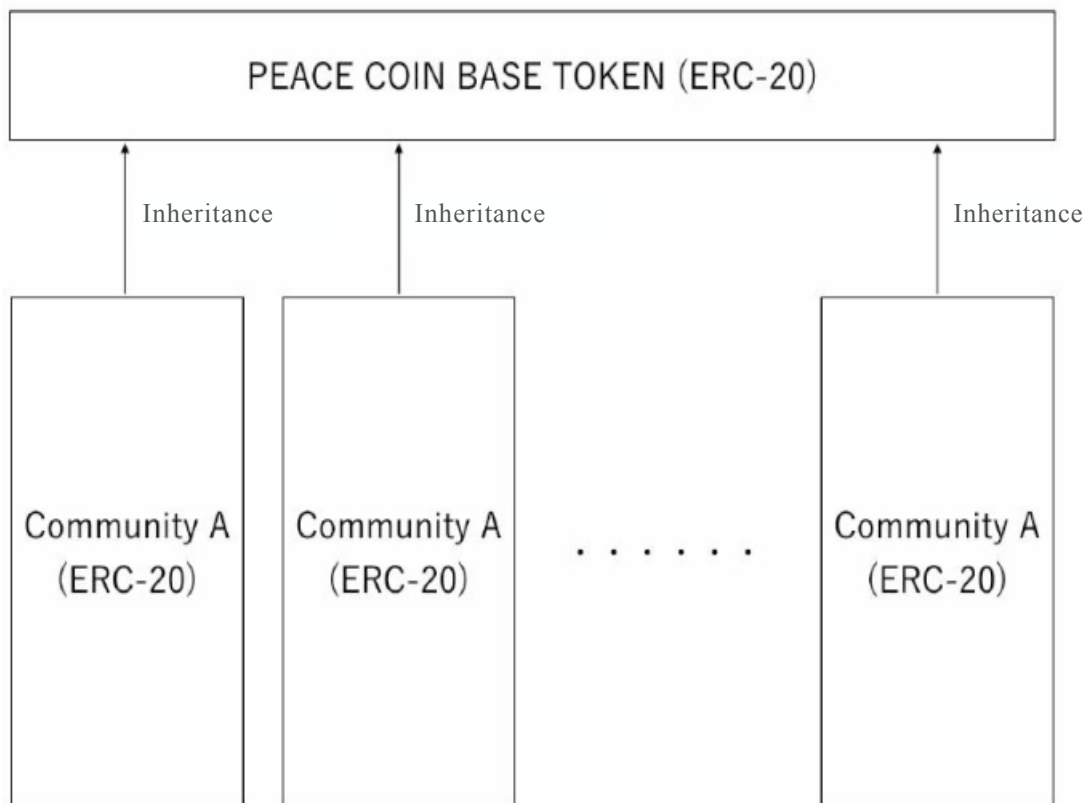
The data storage format using the conventional http protocol depends on the central server. PEACE COIN DAPPS uses P2P hypermedia distribution protocol called IPFS to manage data and messages. Decentralized file groups can be formed on the IPFS nodes, which makes it possible to build applications that are more reliable and server-independent.

6.4 Proof of Thanks

Proof of Thanks executes the algorithm to increment/decrement PEACE COIN across Blockchain Layer and TCP/IP Layer. It analyzes the data acquired by Dapps Layer with its own algorithm, and determines the increment/decrement rate for each account based on the data of values exchanged by the user. The value calculated by Proof of Thanks is captured by Oracle, held in a decentralized form, and determines the behavior of PEACE COIN.

6.5 Token Architectonics

Each Community Currency inherits the basic function of PEACE COIN and has functions unique for each Community/Regional Currency as sub-token. It can also be derived as a currency which has function not only as ERC-20 currency, but also as an asset.



7

ALGORITHM “Proof of Thanks”

7. ALGORITHM "Proof of Thanks"

This chapter explains the details of Proof of Thanks, the distribution logic of PEACE COIN, and ARIGATO CREATION, using mathematical expressions.

PEACE COIN increments by ARIGATO CREATION. ARIGATO CREATION occurs when PEACE COIN is used to send Token to a value provider. The ratio of increment fluctuates according to the value of ARIGATO CREATION and Proof of Thanks score works as an index to concretely decide the ratio of increment.

PEACE COIN gives importance to the long-lasting relationship between users, and the longer transactions between users becomes, the larger Proof of Thanks grows. On the other hand, if the transactions rarely occurs between users during the period, PEACE COIN decrements.

Please note that the formulas presented here are not final and have room of discovering and improving better algorithm for community vitalization. There is possibility for modifications in the future.

7-1 Proof of Thanks

Proof of Thanks is defined to have the characteristics below:

- Proof of Thanks refers not only to the transaction on the said day, but also the transaction history.
- The larger proportion of the remittance to the balance results in the higher Proof of Thanks.
- A mutual transaction between two nodes gives high Proof of Thanks for the both nodes.
- Routinely repeated small transactions gain more Proof of Thanks than sporadic large transactions.
- The larger or more stable account balance than a fixed level is required to score a proper Proof of Thanks.
(This prevents dumping.)

We set Proof of Thanks score ψ as follows:

$$\omega_i \text{normalize}_1(o) + (1 - \omega_i) \hat{\pi},$$

$n \in \mathbf{N}$	Number of All Nodes
$o \in \mathbf{R}^n$	Integrity Vector
$\hat{\pi} \in \mathbf{R}^n$	Pay-it-Forward Volume Score
ω_i	Some Constant between 0 and 1

In the above formula, **normalize₁(x)** is the function that normalizes the magnitude of the vector **x** into 1. Pay-it-Forward Volume score $\hat{\pi}$ is a vector determined by Integrity matrix **O** and Perturbation matrix **E**. The following subsections explain Integrity matrix **O** and Perturbation matrix **E**.

7-1.1 Integrity Valuation

In this subsection, a transaction is represented with the 4-tuple of the date, the source node, the destination node, and the amount of remittance. Let T be the set of all the transactions before the calculation of Integrity valuation. For an element T , the expressions $d(t)$, $src(t)$, $dest(t)$, and $amount(t)$ denote the date, the source node, the destination node, and the amount of remittance of t respectively. The set of all transactions whose source node is A_i , and whose destination node is A_j is stated by T_{ij} . The account balance, the total amount of remittance, and the total amount of receipt of the node A on the date d are expressed by $balance_A(d)$, $remittance_A(d)$, and $receipt_A(d)$ respectively.

We define the integrity of a transaction t in T_{ij} by

$$w_t = b_{1t} \times \left(\frac{a_t + 1}{m_t^{\text{rem}}} + c_t \right) \times \frac{\max(\text{amount}(t) - b_{2t}, 0)}{m_t^{\text{bal}}},$$

where m_t^{rem} and m_t^{bal} are the average over the past 90 days from $d(t)$ of the daily total remittance and the balance of the node $src(t)$ respectively. The terms used above are defined as follows:

$$\begin{aligned} a_t &= \sum_{\substack{t' \in T_{ij} \\ d(t') < d(t)}} 0.9^{d(t)-d(t')} \text{amount}(t') \\ b_{1t} &= \frac{1}{90} \sum_{d(t)-90 \leq d < d(t)} \sigma \left(\frac{\text{balance}_{src(t)}(d-1) - \text{remittance}_{src(t)}(d)}{\text{balance}_{src(t)}(d-1) + \text{receipt}_{src(t)}(d)} \right) \\ b_{2t} &= 0.01 m_t^{\text{bal}} \\ c_t &= \begin{cases} 1 & \text{if a transaction from } A_j \text{ to } A_i \text{ in the past 30 days from } d(t) \text{ exists} \\ 0 & \text{otherwise} \end{cases} \end{aligned}$$

Here, σ denotes the function

$$\sigma(x) = \frac{1}{1 + \exp(10(x - 0.4))}.$$

We define Integrity vector \mathbf{o} , using w_t by

$$o_i = \sum_{j=1}^n \sum_{t \in T_{ij}} w_t,$$

where \mathbf{o}_i is the i -th component of \mathbf{o} . Finally, we define Integrity matrix \mathbf{O} as follows:

$$w_{ij} = \frac{1}{100} + \sum_{t \in T_{ij}} w_t$$

$$o_{ij} = \frac{w_{ij}}{\sum_{i=1}^n w_{ij}}$$

$$\mathbf{O} = ((o_{ij})_{1 \leq i, j \leq n})^T$$

7-1.2 Perturbation

This subsection introduces Perturbation matrix that relates the nodes that do not have a direct transaction. In the calculation of PageRank, Perturbation vector is used to reflect the behavior of the viewers who move randomly to different pages without following the hyperlinks. In terms of mathematics, an irreducible and aperiodic probability matrix can be obtained by adding Perturbation matrix to Integrity matrix described in subsection 7-1.1, which in turn allow Markov chain to have unique stationary distribution.

called Perturbation probabilities. Now, Perturbation matrix \mathbf{E} is defined by

For each node $A_i \in \mathcal{W}$, the values that satisfy $\mathbf{0} < \mathbf{p}_i < \mathbf{1}$ and $\sum_{i=1}^n p_i = 1$ are fixed randomly and are

$$\mathbf{E} = e^t \mathbf{v} = \begin{pmatrix} 1 \\ 1 \\ \vdots \\ 1 \end{pmatrix} (p_1, p_2, \dots, p_n).$$

7-1.3 Pay-it-Forward Valuation

Based on the setting above, we consider the matrix

$$\mathbf{O}\eta + \mathbf{E}(1 - \eta).$$

In PEACE COIN, η is put to 0.8. Since each component of the matrix above is positive, we have that the matrix is an irreducible and aperiodic probability matrix. By the Perron-Frobenius theorem, there exists an eigenvector

π that corresponds to the eigenvalue 1 and all of which components are positive. Let the normalized vector of the eigenvector π be $\hat{\pi}$. Pay-it-Forward Valuation of the node A_i is the i -th component of the vector $\hat{\pi}$.

7-2 ARIGATO CREATION

This section explains the logic on how to distribute PEACE COIN to the nodes based on the calculated Proof of Thanks scores. There are increment (ARIGATO CREATION) and decrement for the distribution scheme.

7-2.1 Increment (ARIGATO CREATION)

PEACE COIN is distributed depending on the Proof of Thanks scores. Increment takes place on monthly basis. While basically more Proof of Thanks earns more PEACE COIN distribution, we set a maximum amount of increment and distribute no more than the limit.



Total Increment

In the increment procedure, we first set the total amount of increment which can be attained by all nodes. The amount of increment for each node is determined by splitting the total amount of increment. By fixing the total amount of increment, we expect to control the circulation of currency as well as improve resistance to attack, for the amount of increment of each node is affected by the other nodes' activity.

Among the total issued PCE, the total PCE owned by the other nodes than those managed by PEACE COIN FOUNDATION is called the circulating PCE. We denote the total issued PCE by I and the circulating PCE on the date d by C_d . The total amount of increment a_{all} corresponding the increment procedure on the date d_1 is defined as follows:

$$a_{all} = \sum_{d_0 \leq d < d_1} \left(1 - \frac{C_d}{I}\right) \times \frac{-\ln(r)}{d_r} \times I,$$

where d_0 is the date of the last increment procedure, and r and d_r are constants that determine the speed of increment.



Increment Amount of Each Node

The amount of increment of individual nodes are the values that the total amount of increment a_{all} distributed by the rate Proof of Thanks score ψ , that is, if we put

$$a_{app} = a_{all}\psi,$$

then the i -th component of a_{app} is the amount of increment of the node A_i .

If the amount of increment of the node A_i above is larger than 30% of the average balance m_{bal} of the node A_i over the past 90 days from the date d_1 , we restrict the actual amount of increment of the node A_i to be $0.3m_{bal}$. For this limiting step, all of the total amount of increment a_{all} of the date d_1 does not necessarily transfer to the circulating PCE.

7-2.2 Decrement Process

If we operate the increment logic alone, the circulating PCE gradually approaches the total issued PCE and the total amount of increment converges to 0, which means the system of the increment is not sustainable. In order to keep the increment system working properly, we introduce decrement to employ the function of decreasing the circulating PCE. The decrement procedure is performed concurrently with the monthly increment procedure. For information to viewers, we are planning to skip the decrement procedure from the time PEACE COIN start to operate to the launch of official version of PEACE COIN Wallet.

The decrement amount is a fixed portion of the account balance. The case that the decrement process on the date d_1 is expressed by

$$a_{dep} = \sum_{d_0 \leq d < d_1} \alpha \text{balance}(d), \text{ where}$$
$$\alpha = \frac{1-r}{r} \times \frac{-\ln(r)}{d_r}.$$

the i -th component of a_{dep} is the amount of decrement of the node A_i . We used the notations d_0 for the date of the last decrement process, and $\text{balance}(d)$ for the vector of which i -th component is $\text{balance}_{A_i}(d)$ in the formulation above.

7-3 Simulation

Those properties are desirable when functions of Proof of Thanks, ARIGATO CREATION, and decrement are under operation as below:

1. The circulating PCE gets to be settled gradually, that is, the total increment and decrement are going to balance as time passes.
2. The increment amount of the nodes that employ the transaction strategy such that the proportion of the remittance to the balance is large and repeat bidirectional transactions are going to increase.

In this section we verify that the algorithm, "Proof of Thanks," has these desirable properties through computer simulation.

Based on the simulation results, we are planning to sophisticate the logic of Proof of Thanks, ARIGATO CREATION, and decrement and then to provide more simulation results that illustrate the preferable properties above.

7-3.1 Simulation using the Simpler Logic

In this subsection, we set the increment and decrement using the simpler logic than the logic described in this chapter, and here we provide the simulation result of the situation where these are balanced.



The Circulation of the Currency

Figure 7.1 shows the circulation of the currency when the increment is made depending only on the amount of remittance and the account balance at the time of transaction, and when decrement is made every day by the fixed rate to the account balance. The increment rate was set to 10% or 3% to the amount of remittance, and the decrement rate was set to 1% to the account balance in the computational experiment.

Figure 7.1a plots the circulation with the model that the increment rate decreases from 10% as the balance increases. In this case, the total increment amount and the total decrement amount balances as the time goes by and the circulation of the currency reaches an equilibrium state. On the other hand, Figure 7.1b and 7.1c are the cases with the models that keep the fixed increment rate to the remittance amount, which were set to 10% and 3% respectively, apart from the account balance. In these cases, we can see the situation that the total increment and decrement amount do not balance and the circulation of the currency continuously increases (Figure 7.1b) or decreases (Figure 7.1c).

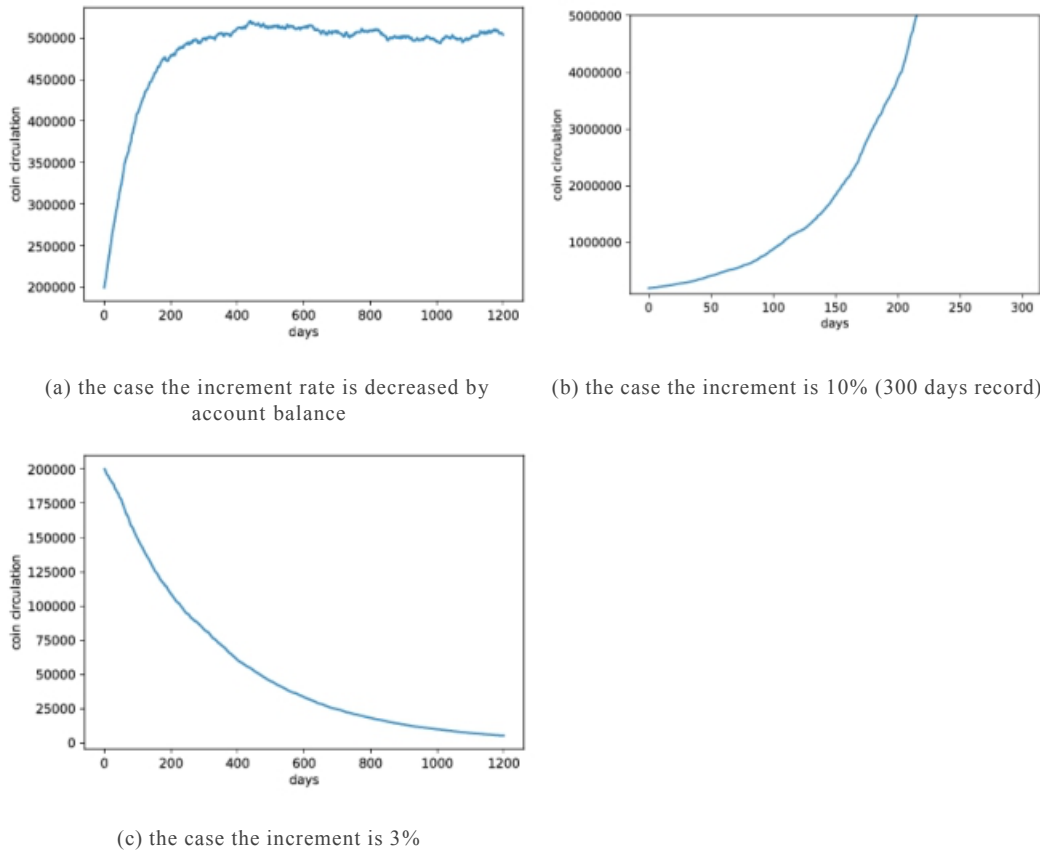


Figure 7.1: The Circulation of the Currency



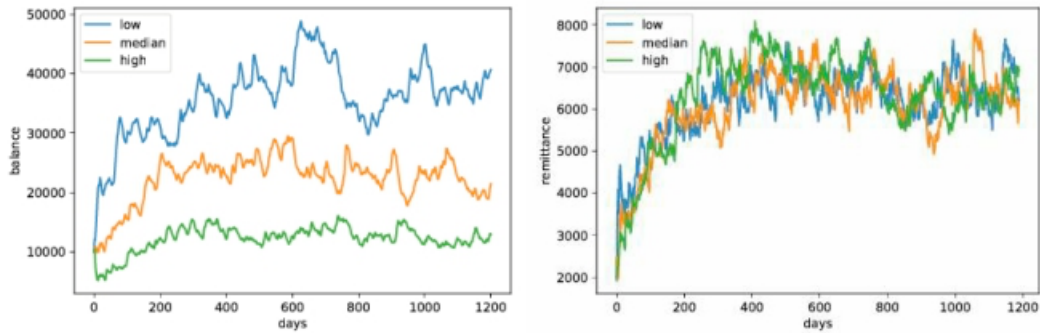
The Account Overview of Individual Node

Figure 7.2 plots the account balance, remittance amount, and increment amount of individual node with the model that the circulation reaches an equilibrium state, which decreases the increment rate by increasing the account balance.

Figures 7.2a, 7.2b, and 7.2c plot the account balances, the amount of remittance, and the net increment amount of the nodes with the different remittance frequency. The net increment amount means the amount deducted the decrement amount from the increment amount. The high, median, and low in the figure mean data plot regarding the node with the highest, median, and lowest remittance frequency respectively.

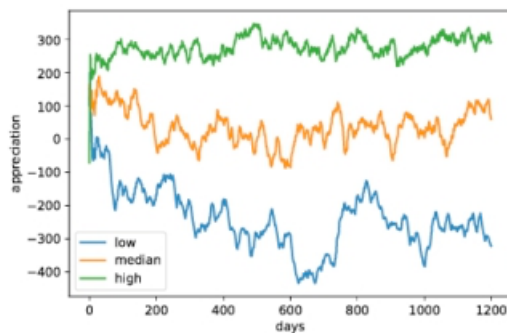
We observe that the account balance of the nodes with lower remittance frequencies gain more currency than the nodes with higher remittance frequency in this simulation. This can be considered because each node randomly selects the remittance destination in the simulation it is possible to increase the account balance by lowering the remittance frequency of its own node and waiting for remittance from other nodes. On the other hand, we cannot see big difference with the remittance amount. We can see the increment amount of the node with high remittance frequency becomes larger, and the decrement amount of the node with low remittance frequency is larger than the increment amount of it.

The simulation result shows the node which transacts actively gains more increment amount with the logic that a part of remittance amount is compensated (increment) depending on the account balance, and a certain percentage of the account balance is deducted (decrement) every day.



(a) transition of the account balance

(b) transition of the remittance amount



(c) transition of the increment amount

Figure 7.2: The Account Overview of Individual Node

7-3.2 The Simulation Result using the Logic described in this Chapter

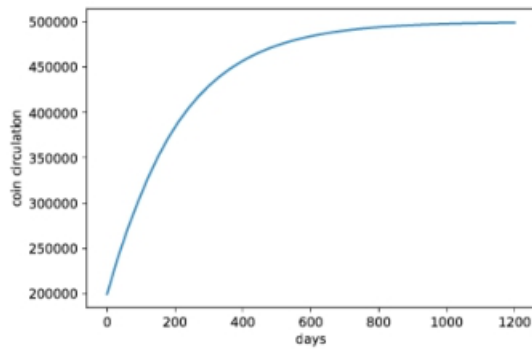
Here we provide the simulation result of the case that increment and decrement are set by using the logic described in this chapter, Proof of Thanks, ARIGATO CREATION, and decrement.

Figure 7.3 shows the result of simulation using the logic described in this chapter. Figure 7.3a plots the transition of the circulation of the currency. This graph depicts the total circulation amount of the currency becomes constant as the time goes by. Figure 7.3b, 7.3c, and 7.3d plots the account balance, the remittance amount, and the net increase amount of the nodes with the highest, median, and lowest remittance frequency respectively. Regarding the net increase amount, actual increment/decrement is processed once every 30 days, but the chart shows the amount converted per day by dividing the actual amount by 30.

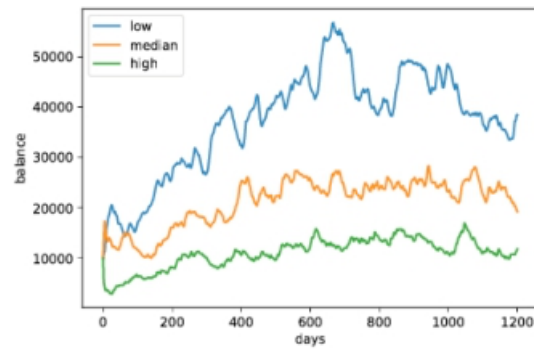
In the simulation using the logic described in this chapter, similar with using the simple logic we described in the previous subsection, we observe that the account balance of the node with lower remittance frequency is larger

than that of the node with higher remittance frequency. However, we cannot see big difference with the remittance amount. And the increment amount of the node with high remittance frequency becomes larger than that of the node with low remittance frequency.

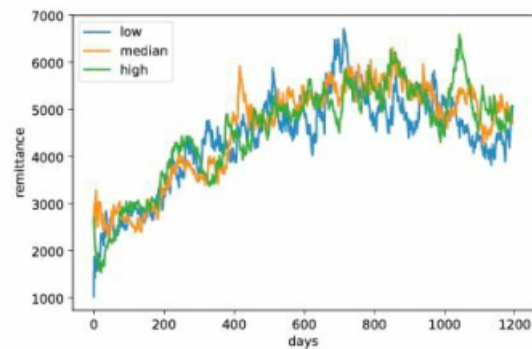
The result of simulation using the logic described in this chapter shows that the total circulation amount of the coin will be constant eventually, and the increment amount of the node with active transaction becomes larger. The logic of Proof of Thanks has the same characteristics as the simple logic that a part of remittance amount is compensated while a part of account balance is deducted. But the parameter setting is more intuitive, and it is easier to set the time to establish equilibrium and the magnitude of increment/decrement when equilibrium is reached.



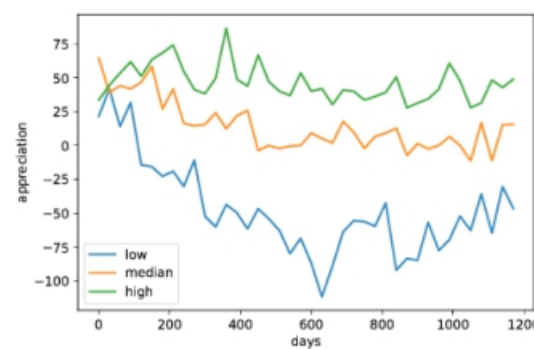
(a) transition of the circulation of the currency



(b) transition of the account balance



(c) transition of the remittance amount



(d) transition of the increment amount (per day)

Figure7.3: The Simulation Result using the Logic described in this Chapter

8

RESISTANCE TO MANIPULATION

8. RESISTANCE TO MANIPULATION

At this point, we plan to use Ethereum Blockchain, so here we explain about manipulation of Proof of Thanks and ARIGATO CREATION, not the manipulation of Blockchain itself.

Please note that the logics in this section are not definite and should be revised accordingly to the growth of the services. As for revision, it is supposed to be performed by users' vote.

8-1 Sybil Attack

Sybil Attack is an act that one entity raises the value of Proof of Thanks improperly using multiple nodes and attempts to acquire increment by ARIGATO CREATION.

The countermeasures against Sybil Attack include followings:

Require identity verification before cashing	
Improve tolerance to attack with Proof of Thanks logic	<ul style="list-style-type: none">• Impose penalties on transactions where the account balance fluctuates greatly• Remittance account balance of too fluctuates small amount greatly will gain 0• Consider (zero) Proof of activities Thanks of other nodes by Pay-it-Forward Volume score
Reduce motivation to attack by setting a maximum limit of ARIGATO CREATION	

8-2 Loop Attack

In Loop Attack, which is a variation of Sybil Attack, an entity repeats remittance between multiple nodes, attempting to raise the value of Proof of Thanks improperly. For Loop Attacks, we are considering countermeasures to raise the cost of Loop Attack by the detection algorithm in addition to the measures against the Sybil Attack mentioned above.

9

ROADMAP

9. ROADMAP

In order to diffuse the use of PEACE COIN in wider society, we believe that it is necessary for more users to actually use this unique token and to experience enjoyment and convenience of it.

PHASE 1

We believe that promotion activities are of great importance so that more users can experience PEACE COIN from the earlier stage. We are planning to hold a lot of events such as meet-ups and hackathons, and to incorporate opinions of people who are interested in this Cryptocurrency.

Since this Cryptocurrency has a completely different concept from fiat currencies, that the amount of this token increases as you use it under certain conditions, token holders will transmit the positive information, which will make great contributions to referral marketing.

Until the launch of PEACE COIN Wallet beta version, PEACE COIN is not going to decrement. (Localized version for each local community or company will increment/ decrement earlier.)

PHASE 2

We believe it important that many users experience the diverse use cases of PEACE COIN in this phase. For example, it can be particularly useful in the fields of arts and academia, the areas where evaluation criteria are difficult such as housework, and the areas with performance-based compensation type such as education, consulting, counseling businesses. In addition, it can work effectively to reduce the cost of personnel evaluation systems.

In this phase, it is also important to involve not only users who are interested in cryptocurrencies, but also people who do not participate directly in current economic activities such as housekeepers and volunteers. We believe that use application of PEACE COIN should not be limited by us.

PHASE 3

The concept of PEACE COIN is widespread, and new economic circles effected by emotions such as preference and interest will be established, which is different from the traditional economy seeking rationality and efficiency.

In these economic circles, people will be able to provide services and products that they purely like. In other words, we aim for a world where people are released from economic concerns by helping each other. PEACE COIN will work as a scale to prove that working for what they “like” is not a self-centered idea.

The total amount of PCE in circulation is linked to PEACE COIN economic circles including increment by Proof of Thanks algorithm and decrement by the personalized rate using AI.

In principle, money is not to be stored more than necessary, it should be used to maintain a social life. Ultimately, rather than putting value on saving money, money should be transferred to others with appreciation. It will lead to a society with money circulated as means of showing thanks to others.

2017

2017 Q1 Initiated the Concept

2017 Q4 Project Started

2018

2018 Q1 Development of PEACE COIN Wallet alpha version

2018 Q3 Development of PEACE COIN Wallet beta version

2018 Q3 Pre-Launch of Community Currency

2019

2019 Q2 Start Operation in Multiple Countries, Arrangement of Evangelist

2019 Trial Period of Community Currency (Localized PEACE COIN)

2020

2020 Release PEACE COIN Wallet for actual use

2020 Listed in Cryptocurrency Exchange

2020 Establishment of PEACE COIN FOUNDATION

2021 ~

2021 Start Exchange System of PCE and Localized PCE

2021 Start Increment/Decrement of PCE Token

2022 Implementation of Importance (the Quantification of Thanks) by Phonetic Recognition to PEACE COIN Wallet

2022 Implementation of Importance by AI (Personalized Increment/Decrement)

Contents

10

THE FOUNDATION

10. THE FOUNDATION

PEACE COIN is planning to establish PEACE COIN FOUNDATION in Switzerland in the 2020. PEACE COIN FOUNDATION will supervise the administration, fund management for development and operation, and asset management for tokens, donations and other asset of the communities that uses PEACE COIN.

Moreover, in case of continuous donation (refer to Use Case 7), we plan to facilitate establishing local foundations for sustainable donation system using PEACE COIN increment by Proof of Thanks. It will enable local communities and organizations in each area to develop the same system independently.

11

FUNCTIONS OF THE WALLET

11. FUNCTIONS OF THE WALLET

PEACE COIN Wallet is designed not only to deposit, store and withdraw PCE, but also to encourage user to use PCE.

We define payment as a tool to approve other people, by creating work for them. PCE is a Cryptocurrency usable to make payment by emotional reasons such as preference for a certain service or a person, rather than profit-and-loss arithmetic.

PCE is designed to accelerate velocity of circulation by increment and decrement. Attaching messages upon remittance will increase the increment rate.

We aim to create opportunities for essential learning of economic activity, as well as to create new economic circles by connecting people with enjoyment and secure feelings. Payment with PCE makes people more aware of connection with society, and thankful feeling inside them.

Main functions of the Wallet are followings:

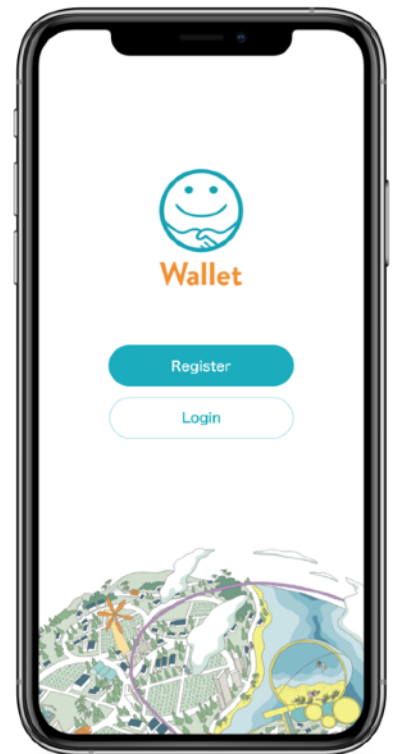


PEACE COIN Wallet

- PCE balance
- Daily usage
- graph
- Thanks rate (Increment rate by Proof of Thanks)
- Message rate (Increment rate by payment with messages)
- Remittance
- Receipt
- Receipt History

Functions below will be added soon:

- GPS locator (enables remittance to unacquainted person, in a secure way)
- Quantification of Thanks by phonetic recognition
- Personalized individual importance (increment/decrement rate) by AI





PEACE COIN Wallet Localized Ver.

Localized Wallet is for the use of 2 to several dozens of community members. Additional functions to general PEACE COIN Wallet are followings:

- Contribution rate (use rate inside the group) graph
- Utilization of Message data



Localized Wallet is enabled to set Contribution rate and Message function in addition to increment/decrement rate that matches to the community or organization. The following effects are expected.

By visualizing Contribution rate, you can see who is sending more PCE. The remittance of PCE represents situations that a member is asking favor to someone, or showing thanks to someone, which makes you feel the remittance positively.

Utilization of Message function will contribute to the prevailing of behavioral guidelines and vision, and the improvement of management in the community or organization. It also enables multidimensional evaluation not bound by the rules established by superiors.

12

FINANCE

12. FINANCE

Name of token	PEACE COIN
Token symbol	PCE
Contract address	0x7c28310CC0b8d898c57b93913098e74a3ba23228
Blockchain	Ethereum(ERC-20)
Notes	<ul style="list-style-type: none"> ● Listed Token which can be exchanged to PEACE COIN Token with Proof of Thanks algorithm at the rate of 1:1. ● No maximum limit of issuance (Controlled by Proof of Thanks algorithm) <p>The maximum initial issue amount shall be 3,000,000 PCE, or December 31, 2025 (UTC +2:00) whichever is reached first.</p> <ul style="list-style-type: none"> ● 30% of them will be used for operation, 50% for development, 15% for promotion, and 15% for legal and regulation

Name of token	PEACE COIN NOTE
Token symbol	PCE-NOTE
Contract address	0x6326a02ed7A19Df409b0f63d4b272d11e3dEb14e
Blockchain	Ethereum(ERC-20)
Notes	<ul style="list-style-type: none"> ● Token Voucher which can be exchanged to PEACE COIN Token with Proof of Thanks algorithm (not “Listed PCE”). This will be distributed to communities which implement PEACE COIN. ● The maximum issue amount shall be 100,000,000,000 PCE-NOTE, or December 31, 2025 (UTC +2:00) whichever is reached first. ● Up to 10% of the 100,000,000,000 PCE-NOTE shall be issued each quarter in 2021 and the unissued balance shall be carried forward. <p>Up to 5% per quarter in 2022, up to 4% per quarter in 2023, and up to 3% per quarter in 2024-2025.</p>

Contents

13

TOKEN-ISSUING COMPANY

13. TOKEN-ISSUING COMPANY

COMPANY NAME PEACE COIN OÜ

COMPANY ADDRESS Narva mnt 5, Tallinn, Harjumaa, 10117, ESTONIA

REGISTRATION NO. 1334503

Website : <https://peace-coin.org>

Facebook : <https://www.facebook.com/PEACECOIN.PCE/>

Twitter : https://twitter.com/peace_coin_ou

Telegram : https://t.me/joinchat/HVrKhEgib7G87tCv71T_fw

GitHub : <https://github.com/peace-coin-org>

14

CONCLUSION

14. CONCLUSION

Thank you for reading this long white paper.

The world view which PEACE COIN aims to realize is “Rich Society”, and we believe that we need to increase in diversity and to create a society with culture of inclusion for the purpose.

When we understood the excellent consensus algorithm of Proof of Work, including Blockchain technology which created Bitcoin, and when we touched upon the concept of Crypto Currencies such as Ethereum that implemented Smart Contract, we felt a true revolution. Those technologies enabled us to conceive the idea of PEACE COIN. We express our greatest respect for engineers who are contributing the development of Crypto Currencies, and community of people who have been supporting them.

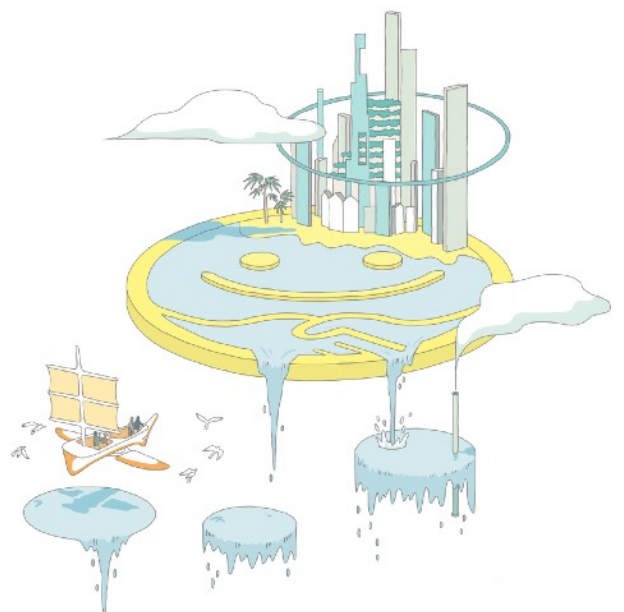
We believe the algorithm of PEACE COIN, Proof of Thanks will actualize the concept that people had better help each other in terms of the mechanism, like the mechanism of Bitcoin shown in Proof of Work.

If you drop your valuable like your wallet in somewhere, you may have little possibility to retrieve it. But you should be glad if your wallet comes out. This has nothing to do with cultures and races, so the actions to be taken by the person who picked up your wallet should be clear.

If the new economic system promotes the profit of yourself and also profit of other people, and if people become acclimated to the new economic system, the world should be a little more peaceable. We believe that the more people care for others’ feelings, the more peaceful this world will be.

In the last place, we would like to express our sincere gratitude to many people who cooperated with PEACE COIN. And for those who approve our concept and vision mentioned in this white paper, please join our Token Sale and create a new economic system together with us. Let us aim for a “Rich Society”, where money circulates by Thanks, with PEACE COIN. We, the PEACE COIN team conclude this white paper, looking forward to the day a new economic system is created with you all.

RyoichiAbe



UPDATE HISTORY

June 22, 2018 : Additional contents in Chapter 3 TARGET MARKET AND MARKET SIZE, Chapter 7 ALGORITHM "Proof of Thanks", and Chapter 8 RESISTANCE TO MANIPULATION

August 9, 2018 Amendments in Chapter 1 ABSTRACT, Chapter 7 ALGORITHM "Proof of Thanks", and Chapter 16 CONCLUSION, additional contents in Chapter 2 BACKGROUND, Chapter 3 TARGET MARKET AND MARKET SIZE, and Chapter 6 BLOCKCHAIN TECHNOLOGY USED FOR PEACE COIN, and graphics replacement in Chapter 11 FUNCTIONS OF THE WALLET

August 23, 2018 : Additional contents in Chapter 1 ABSTRACT, Chapter 2 BACKGROUND, Chapter 3 TOKEN CONCEPT "ARIGATO CREATION", Chapter 4 TARGET MARKET AND MARKET SIZE, Chapter 5 USE CASE, Chapter 6 TECHNOLOGY, Chapter 7 ALGORITHM "Proof of Thanks", and Chapter 9 ROADMAP, graphics replacement in Chapter 11 FUNCTIONS OF THE WALLET

November 29, 2018 : Amendments in Chapter 9 ROADMAP, Chapter 10 FOUNDATION

December 20, 2020 : Additional contents in Chapter 4 "Trading in Free Market", "Market Price of PEACE COIN" and Amendments in Chapter 9 ROADMAP and Chapter 12 Finance.

APPENDIX 1. COMMENTARY

Here I introduce the Use Cases of PEACE COIN. In addition to these cases, there can be several scenes for utilization.



Use Case 4 Utilization to Evaluation System in the Health and Welfare Fields

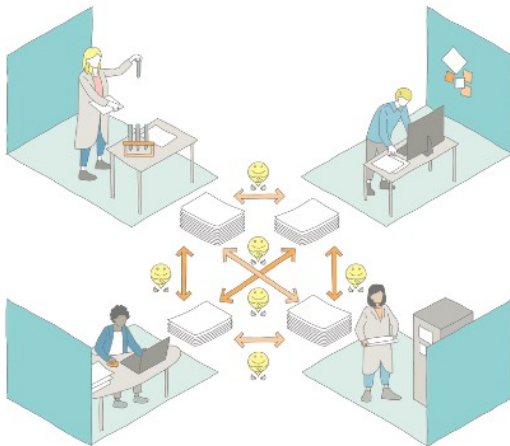


At a Senior Care Home, care receivers pay a part of care costs by PEACE COIN to caregivers. At the same time, they can attach some message like “you cared me well”, “I appreciate your quick response”, etc. and make evaluations as well. Caregivers who get higher marks receive more PEACE COIN.

Care receivers can pass PEACE COIN as tips to show their thanks easily, as PEACE COIN increments to a certain extent when you use it. As a result, caregivers who receive more thanks get more remuneration by PEACE COIN, which leads to better care service given to care receivers.



Use Case 5 Utilization on Monograph Platform

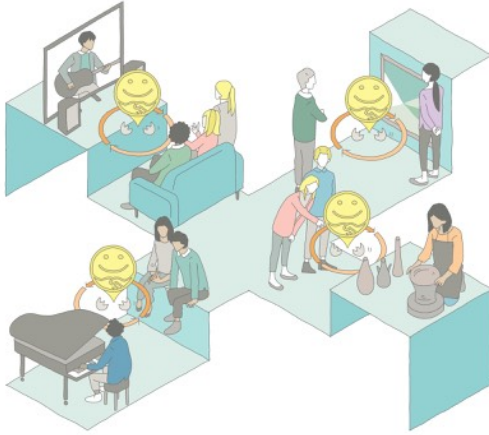


Compensation for quoting a monograph is paid by PEACE COIN. The more the monograph is quoted, the more PEACE COIN they will receive. It proves how valuable the monograph is.

Researchers will be able to cover all the research cost by those quoting fees, once the number of quotations exceeding certain times.



Use Case 6 Utilization on Creators' Platform (Music/Movie)



When listening to music and viewing movies on the online platform, you will pay the fee directly to the artist by PEACE COIN.

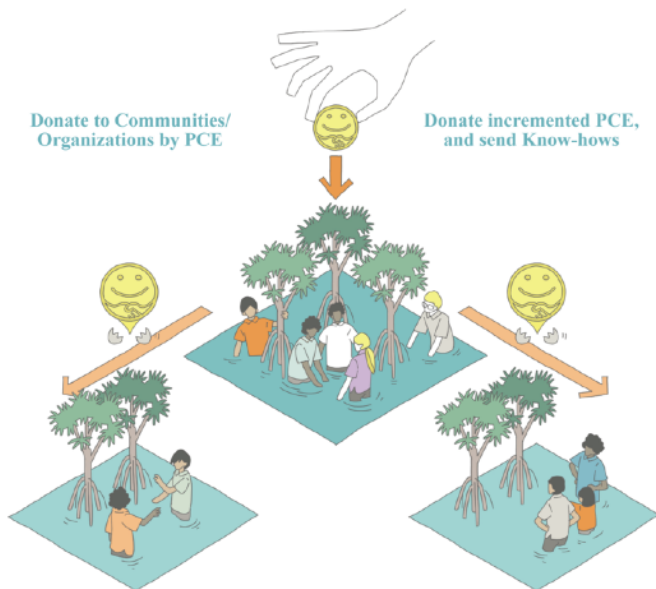
Artists will be able to receive consideration for their work. If a listener or viewer attaches some message upon payment,

the listener or viewer will gain additional PEACE COIN.

If an artist has more than a certain number of fans, it could be more efficient monetization than existing video advertisements, which will revitalize the artist's production release.



Use Case 7 Utilization as Independent Charitable Activity



You can make continuous donation using PEACE COIN incremented by ARIGATO CREATION. For example, in the case you donate 10,000 PCE to a certain local community, it can be divided according to purpose of use, such as 4,000PCE for free use, 3,000PCE to purchase smart phones, 3,000PCE for personnel expenses, and teach them how to create and manage self-sustaining local economy.

PEACE COIN FOUNDATION (refer to Chapter 10 for details) will be able to accumulate increment/decrement rate information and know-how that matches to attributes of each region or organization, by collecting activity information carried out in various parts of the world.

The local community or organization that receives donation aims to independent operation, and when they achieve certain level of independence, they will offer PCE and know-hows to other local communities or organizations as next step.

Moreover, it is expected that their management skills and happiness level will also be improved by this step.

APPENDIX 2. COMMENTARY

Comparison of Community Currencies

Community Currency (Regional Currency) is not a Legal Currency. It is an original currency used within a specific region or community with purpose.

There are some types of Community Currencies.

- LETS Local exchange trading system type. Paper money is not issued, and the balance is recorded in passbooks or online accounts. Transactions are carried out with the numbers. The advantage is that you can purchase goods even if you don't have balance in your account. And the value of the money will not decrease because of too much issuance. The disadvantage is that recording all transaction is troublesome.
- Stamp Money type. After paper money is issued and a certain time has passed, you need to buy a stamp of specified percentage of the face value, and past it at the back of the bill. This is a system to reduce the value of money as time passes. The advantage is that money will circulate rather than being stored by decreasing the money value. The disadvantage is higher risk of counterfeiting because it is easy for anybody to issue the money.

A Successful Case of LETS "Bunya"

In 1987, it was introduced in Maleny, Australia. Jill Jordan, who established a credit union and co-op in Maleny, introduced a Local Currency System LETS with units called "Bunya" to promote economic activities of people who cannot be covered by the credit union.

Bunya AUD, interest-free and ledger type of Community Currency. They don't issue paper money or coins.

At that time, there were many unemployed people in the town of Maleny. Then young people who were physically well worked for elder people in LETS, and the elderly taught skills which they had learned from their experience to young people. This kind of exchanges connected elder people to young people, and the system to help each other was developed.

This generated the purchasing capacity of the poor and enabled mutual support by exchanging the abilities of the young and the elder, which resulted in social benefits as well as economic benefits that gave opportunities for low-income people to buy and sell goods and services.

By 2002, 15 years after introduction of Bunya, more than 300 Local Currency LETS spread throughout Australia.



<u>ACKNOWLEDGMENT SLIP</u>	
Date _____	
Name _____	M/Ship No _____
Signature _____	
Pays _____ RAYS	
Name _____	M/Ship No _____
Service Provided _____	
Interlets _____	LETS System Area _____

A Successful Case of Stamp Money Chiemgauer

It is a Regional Currency started in 2003 in Bavaria, Germany. Christian Gelleri, a high school teacher, started this project with his students.

Bills of 1, 2, 5, 10, 20, and 50 Chiemgauer are issued. And it decreases the value by 2% every three months.

Chiemgauer office sells 100 Chiemgauer at €97 to local NPOs, and local NPOs sell 100 Chiemgauer at €100 to consumers.

The 3% commission fee can be used for the NPOs' activities.

Consumers choose one out of about 250 NPOs, purchase 100

Chiemgauer at €100, and use it at local shops. This means a consumer donates €3 indirectly to the NPO they support.



NPOs can also re-exchange Chiemgauer to Euro with 5% commission fee. Moreover, they can capture tax benefits with discount for accounting. They can avoid the 5% fee if they use the received Chiemgauer for payment to another NPO. Out of this 5% commission fee, 2% will be currency management expenses, and 3% will be donated to local NPOs such as kindergartens, sports clubs, and music schools.

Chiemgauer also provides financing in complementary currency, and for companies which repaid in full within the deadline, they have cash back service of interest (specifically, the interest excluding 19% VAT of Germany). Within 3 years from establishment, they had 1,000 purchasers and 70,000 Chiemgauer circulated, and in 2011, it grew to a scale of 650,000 Chiemgauer circulation.



※ Quoted from IJCCR

APPENDIX 3. COMMENTARY

In this chapter, some topics related to PEACE COIN are described based on NEM Technical Reference (1). The contents of this reference include citations from NEM Technical Reference and explanations on it.

A.1 A reputation system for nodes

In order to resist malicious activities by the nodes that broadcast invalid information on transactions, it is effective to implement a system that evaluates the trust values of the nodes by sharing the ratio of receiving erroneous information from each node. However, by simply sharing the ratio of deriving false information from a node, it is possible for hostile nodes to harm intentionally the reputation for a node in spite of its honesty. This problem can be solved by evaluating the credibility of the feedback of other nodes as well as the nodes themselves. For more detailed discussion, refer to the original paper of EigenTrust++ (3). Introducing these evaluation system of reputation of the nodes enables a node to select appropriate nodes to interact to withdraw the information by reviewing the calculated the trust values. It is verified by computational simulations that the reputation system reduces the number of the interactions of receiving deceptive information considerably.

A.2 Resistance to Attack

The algorithm of Proof of Thanks, which describes the distribution logic in PEACE COIN, has been developed by referring to Proof of Importance in NEM. Here, we explain the methods employed by NEM to resist attacks in order to prepare for the coming arguments for resistance to attack in PEACE COIN.

A.2.1 Sybil Attack

Generally, in peer-to-peer systems, there are risks that faulty or malicious entities attempt Sybil Attack (2). Therefore, even with a Cryptocurrency system based on Blockchain, it is necessary to consider tolerance to these attacks. Since PEACE COIN has financial rewards called ARIGATO CREATION, attackers are presumed to be highly prompted to attempt Sybil Attacks.

In NEM, the system is carefully designed to prevent Sybil Attacks, and the resistance to attack is verified by computational simulations. Below we see the results of the simulations to demonstrate the resistance of NEM by citing NEM Technical Reference (1).

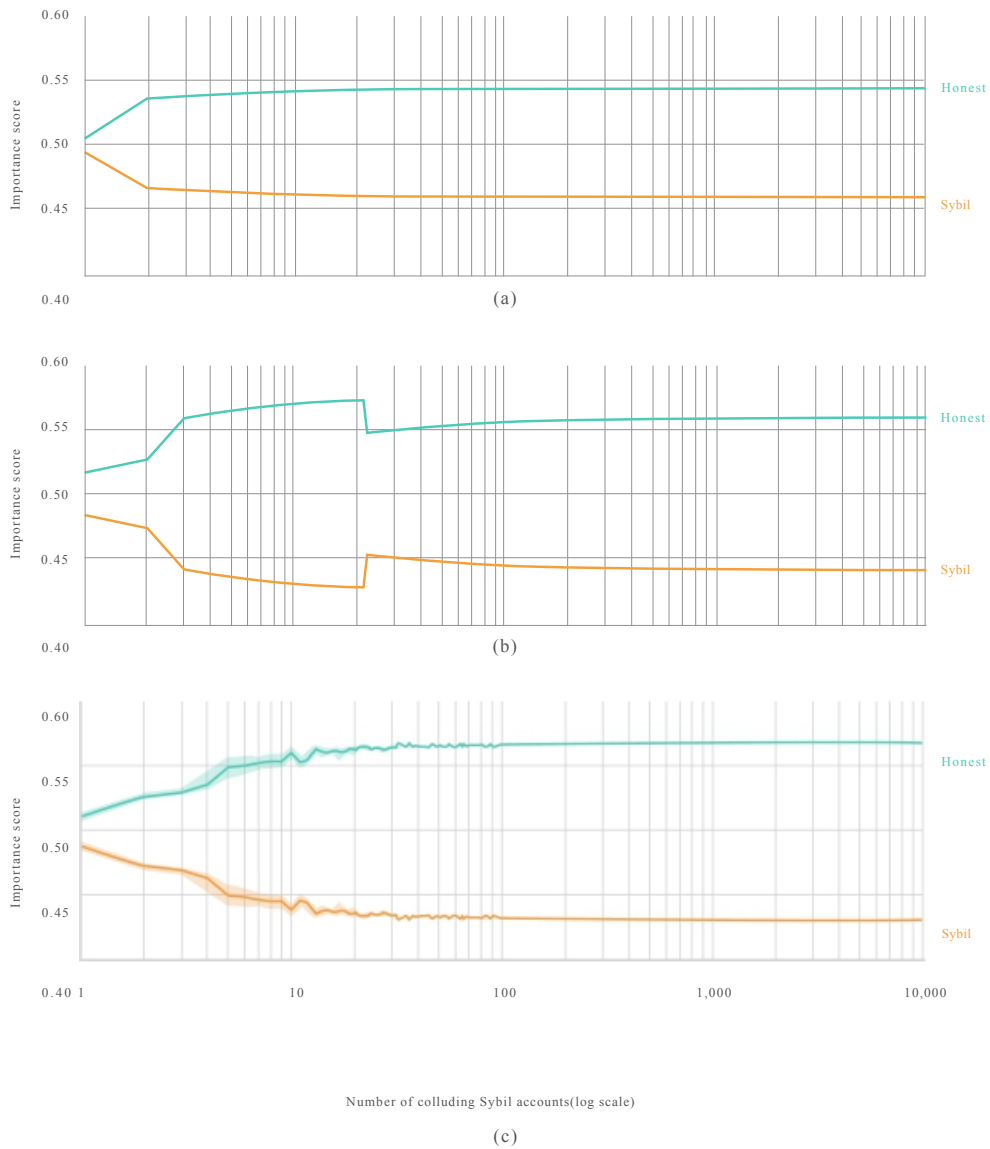


Figure A.1: Proof of Importance scores obtained by Sybil Attacks (I)

Figure A.1 shows the results of the simulation of attacks from malicious entities. Here they simulated in 3 conditions below:

- (a) sends currency around in a loop between controlled accounts,
- (b) vests the currency in controlled accounts and then sends them all to a single master account, and
- (c) sends currency from each controlled account to a random account.

It can be seen that Proof of Importance score in NEM cannot be boosted radically by increasing the numbers of the nodes that the attackers exploit. Therefore, gaming on scores in NEM will not earn a significant advantage over nodes with the same balance which do nothing. PEACE COIN is also a system using Blockchain technology, and the resistance to Sybil Attacks needs to be considered as the arguments above. We are planning to verify the resistance of distribution logic in PEACE COIN through computational simulations.

APPENDIX 4. BIBLIOGRAPHY

- (1) “NEM Technical Reference” https://nem.io/wp-content/themes/nem/files/NEM_tech_Ref.pdf Retrieved 2018-03-28.
- (2) Douceur, John R. “The Sybil Attack”. In Peer-to-peer Systems, pages 251–260. Springer, 2002.
- (3) Fan, Xinxin, et al. “EigenTrust++: Attack Resilient Trust Management.” Proceeding of 8th IEEE International Conference on Collaborative Computing: Networking, Applications and Work Sharing.

Arigato!!

<https://www.peace-coin.org>

© PEACE COIN OÜ All rights reserved.

