BITCUB

WEALTH FOSTERING FOR COMMUNITY

WHITE PAPER & BUSINESS PLAN

14 September 2017

WRITTEN BY: THE BITCUB TEAM

"BITCUB is a Blockchain/Distributed Ledger platform specially designed for community based finance. The smart contracts, payments and community credit system will enable community focused financial organisations such as Credit Unions to leverage ground breaking new technology, providing engaging new products, whilst reducing operational costs and ensuring regulatory compliance.

The distributed apps created will allow the free flow of 'vestiges of value' in a community and will not just be limited to financial transactions."

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Contents

1. Executive Summary

1.1 The Problem

Many operating in the world of community based finance are underserved when it comes to technology that truly benefits their members. Systems provided by the established Financial Services providers are often designed for larger banks and do not 'scale down' well. Compliance with central bank and regulations such as General Data Protection Regulation (GDPR) and the Payment Services Directive 2 (PSD2) with limited resources present additional burdens. GDPR will come into effect on the 25th of May 2018 and could mean that any non-complying institution could be exposed to a €20 million fine.

1.2 A Community Based Solution

At the core of the BITCUB project is technology that has major benefits for those operating in the world of community based finance. This technology uses a new type of blockchain and distributed ledger technology (DLT) providing cost effective and compliant services for management, in addition to engaging new products for the community members they serve.

1.3 Products and Benefits

The BITCUB team are delivering financial instruments including decentralised apps (DAPPS) and a finance platform for managing, communicating, generating, sending and receiving credit and funds.

This blockchain technology enables the delivery of :-

1. A core banking system.
2. Secure and compliant customer centric smart contracts for all agreements.
3. A fully integrated cross border payment/remittance system
4. New member engagement products.
5. A new system whereby community members can earn credits from doing good deeds. These credits can then be sponsored by another party and transformed into BITCUB or another currency.

This platform will allow only the very best DLT companies to participate in providing these services and the Artificial Intelligence Engine will only select the best technology for a given application. This platform is being created for the long term and those participating will be able to benefit from beneficial rates on loans and

savings products in addition to an appreciating crypto currency BITCUB which can be also be traded in exchange for goods and services.

The main benefits for Community Focused Financial Organisation (CFFO's) are associated with reduced operational costs (up to 30%) , new engagement products, and improved security and compliance.

From a user perspective, additional benefits include a more streamlined process for accessing finance, low cost remittances, better interest rates on savings and loans, the ability to get credits from fellow community members and earn in the process, engaging new products for children and partaking in a global community with a genuine focus on inclusion, development and wealth fostering.

A principle differentiator from other ICO's is the fact that this technology can be provided by credit unions and other community focused finance organisations that have earned the respect of its members over the years offering integrity, credibility and stability.

The process for the application of a full banking licence has been started and this will complete in by the middle of 2019. This will allow BITCUB to operate as a 'challenger bank' in certain jurisdictions.

1.4 The Team

A group of highly motivated technologists and business leaders with vast expertise in delivering financial products and services to credit unions.

1.5 The Market and Potential

The initial target market will be the 68,000 + credit unions in 109 countries servicing 231 million people in the world today who wish to introduce new efficiencies, further engage their existing members and attract new ones. With people becoming genuinely tiresome of the culture that still prevails amongst the larger financial institutions there has never been a better time for Credit Unions with their community driven ethos to deliver a great alternative.

Member assets in Credit Unions the US alone were in excess of $1 trillion in 2014. This is expected to grow by 10% by 2020. All over the globe Credit Unions are looking to make their operations more streamlined whilst becoming more relevant for their members in this digital age.

 With BITCUB credit unions will be able to automate and regulate many inefficient internal processes whilst attracting new members with engaging and relevant products and services. They will be able to offer creditable remittance, microloans, and savings products with the potential of delivering higher returns compared to

current offerings. It will also provide a suite of novel products that will help engage new members, including the younger demographic that may have eluded them up until now.

1.6 Business Model

BITCUB will start by offering products and services to compliment existing Credit Union products. The first Community Credit (CC) application rewarding local community heroes will be entirely free. Thereafter, there will be a subscription SaaS model for an annual licence for access to the platform. Costs will depend on the size of the organisation, transaction volume and the number of DAPP's purchased. Credit Unions will be able to earn a transaction fee for remittances as they will provide a real cost saving for those people currently using Western Union etc. This remittance market is currently worth over $540 billion per annum and Credit Unions are perfectly poised to take a slice of this market with the right products. Efficiencies gained along with new custom will result in higher dividends being paid to its' members.

1.7 Financials

We require €2 million for the pre- ICO stage of the project and then a further €10 million to cover development and expansion in the next 24 months. 60% of the funds raised will be spent on software development and system Integration, funding the management team and the remainder will be spent on Marketing and compliance. BITCUB tokens may be purchased for 0.01 Ether each. These will be converted to our tradable BITCUB post the ICO, with a timed release across various exchanges.

In this volatile crypto currency market we will be incentivising the retention of BITCUB tokens though a dividends and rewards scheme. This will be based on retention time, traction and performance. Each token investor will be able to login to their BITCUB account have full visibility of their asset, including voting rights, rewards entitlements and so on.

Those participating in the ICO will also be able to distribute rewards to those earning community credits for the performance of good deeds in the community.

The next two years will be spent on developing and growing the business. Developing symbiotic relationships with play a key part in working up to revenues of over $100 m in year 5.

Over the next 2 years 30 people will be required to run the business and move into new markets. 18 developers, testers, system integration and security specialists are required to develop the system further over the next 2 years. There will be 4

additional team leaders/project managers required, 2 market compliance legal specialists, 4 marketing specialists, 2 admin staff and 4 sales staff.

10% of all profits will *always* be used for charitable causes, sponsoring and fostering wealth creation in the most deprived communities on the planet.

	Year 1	Year 2	Year 3	Year 4	Year 5
Licencing Fees	955,040	3,345,900	15,678,900	45,980,765	66,675,630
Transaction Fees	36,960	747,600	2,786,490	16,221,620	35,987,980
Partners	3	6	16	24	36
Total Rev	992,000	4,093,500	18,465,390	62,202,385	102,663,610
Expenditure	2,120,560	4,623,560	13,870,680	34,676,700	62,418,060
Net profit	-1,128,560	-530,060	4,594,710	27,525,685	40,245,550
%	-113.77%	-12.95%	24.88%	44.25%	39.20%
Full time jobs	9	30	92	320	580

The financial projections above show that the project will enter profitability in year 3. Licencing fees will be the main revenue generator in the early days when transaction fees through remittances begin to grow eventually making up over 30% of revenues. The 580 jobs do not include the local ambassador positions being funded by the organisation at a local level.

The vast majority of expenditure will be focused on rewarding people involved with working on and helping to promote the project.

2. WHITE PAPER OBJECTIVES

The principle objective of this paper is to summarise the transformational technology that is being developed as part of the BITCUB project and provide information on the business plan that will make it happen. It has been created to act as catalyst for like-minded individuals and communities to understand, engage and invest in a major game changer in community based finance.

This paper contains elements for all, even those who are new to blockchain.

3. A NEW BLOCKCHAIN/DLT TO SERVE THE COMMUNITY

We present a new blockchain and distributed ledger based platform specially formulated for community orientated finance organisations and facilitators. This includes credit unions, co-operatives, building societies and *any* groups coming together to better serve their communities irrespective of location, access to technology, infrastructure and resources. The term we will use in the remainder of the document for these is 'Community Focused Financial Organisation' or CFFO.

Our focus is on fostering wealth in community, growing and enhancing value wherever possible.

The objective is to provide a decentralised network which joins all of these entities with enablers for the creation, management and distribution of wealth.

4. EARN CURRENCY AND COMMUNITY CREDITS

Not only will individuals and communities be able to use currencies with these apps they will also be able to earn community credits that can be turned into currency at a later stage through sponsorship.

So for example if 14 year Juan in Venezuela helps his neighbour fix a broken fence to keep his goats in he can be rewarded with credit which can be later be turned into a monetary value.

The system will be created in such a way as to use the blockchain and other distributed ledger technology to create an irrefutable ledger of activities and transactions, and will be capable of excluding members who abuse the system. A new type of proof of work will involve ratification of good deeds via member credits and other supporting information.

5. REVENUE GENERATION

Although the first solutions will be aimed at community based organisations such as building societies and co-operatives, this will be followed by more commercially driven applications. We believe that everyone should have opportunities to create wealth for themselves.

6. TECHNOLOGY FOR SOCIO ECONOMIC INCLUSION

6.1 Blockchain Backbone

At the core of BITCUB will operate a blockchain/DLT architecture and distributed application network.

7. What is the BITCUB Blockchain?

The name **BITCUB** was coined through the amalgamation of **BIT** for enabling digital technology (bits and bytes) **CU** standing for community and **B for blockchain.**

8. Why Blockchain?

The core difference between current systems shown on the left below and blockchain based transactions on the right below is that transactions are not managed centrally but rather in a decentralised network where each participant (node) has a vote on a transaction.
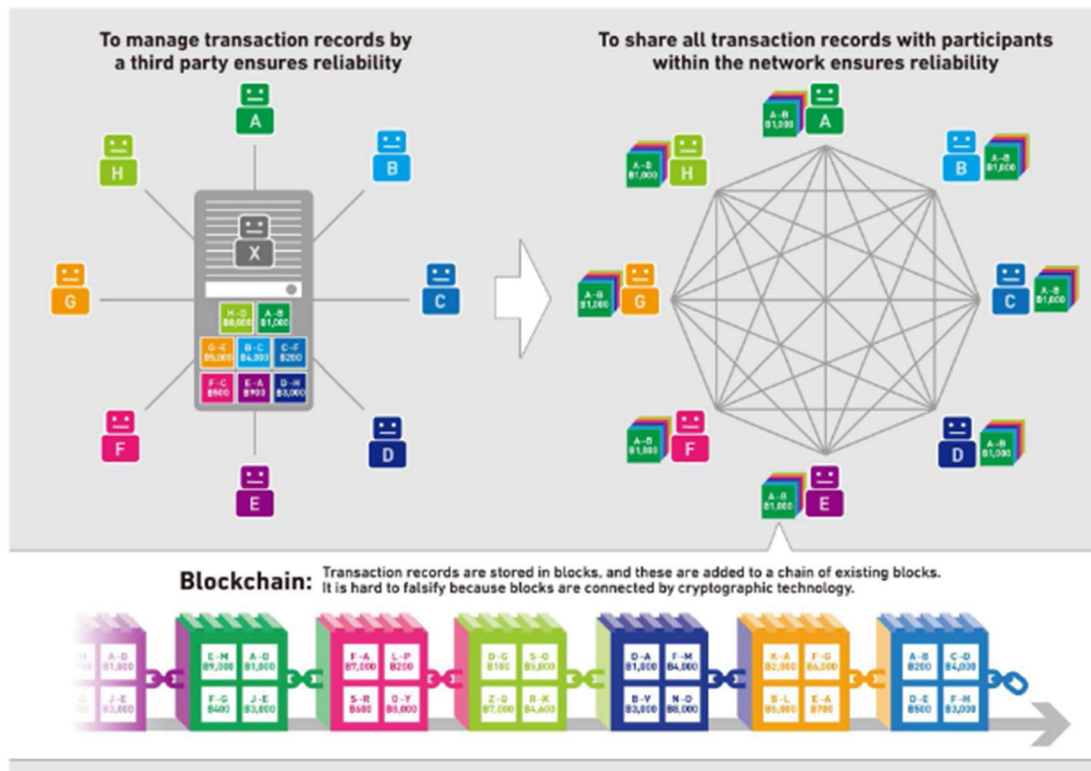
BITCUB – WEALTH FOSTERING FOR COMMUNITY

9. Blockchain and Decentralised Ledger Technology a brief History

The main protagonist behind blockchain technology was an entity or group going by the name of Satoshi Nakamoto. In November 2008 a white paper was produced and communicated outlining a proposal for a peer to peer cash system. Now this was the first attempt as David Chaum came up with a similar concept in 1989 but apart from some interest by the Mark Twain bank in 1995 the project died in 1998.

At the core of distributed ledger technology and blockchain is community. A decentralised community located anywhere in the world that can facilitate smart contracts and transactions without any middle men. All transactions are signed by fellow community members on the network who get rewarded with a 'mining' fee* for overseeing these transactions.

*This is for Proof of Work algorithms only

The diagram below shows how individual transactions are fed into the blockchain, and processed into blocks and then validated by miners . Note how any blocks are rejected if they do not satisfy the requirements.
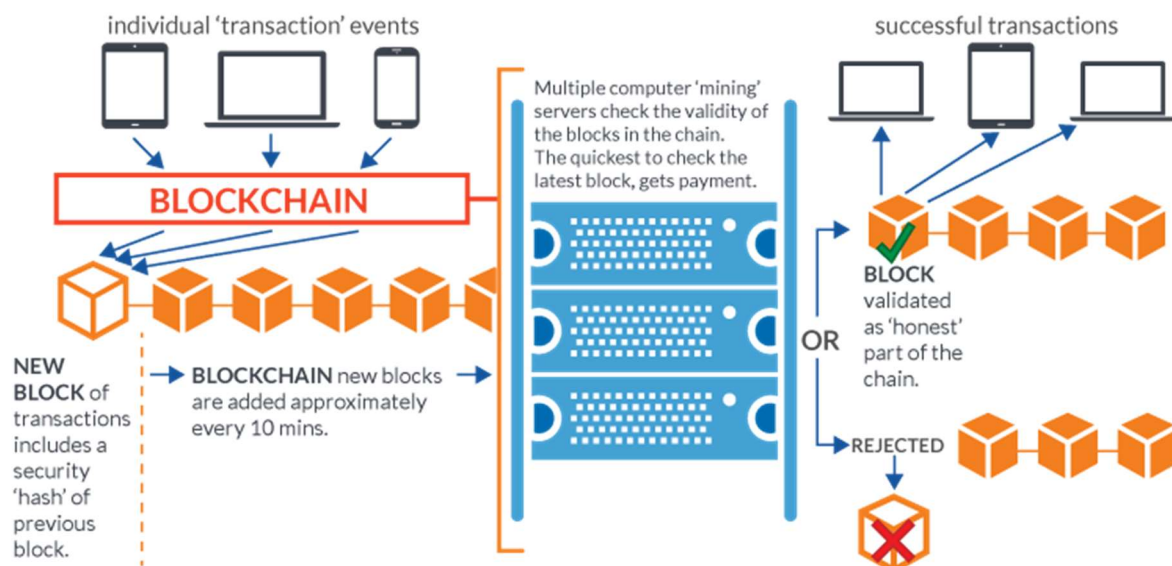
The anatomy of a block on a Bitcoin type blockchain is shown below. Note how each transaction is fed through a program to get a hashed value. These are then combined into a Merkle tree.

Making a hash of it

INPUT
Transaction A
Any length of data

OUTPUT #A
#DFCD 24D9 AEFE 93B9
Unique hash value of fixed length

Each transaction in the set that makes up a block is fed through a program that creates an encrypted code known as the hash value.

Hash values are further combined in a system known as a Merkle Tree.

The result of all this hashing goes into the block's header, along with a hash of the previous block's header and a timestamp.

The header then becomes part of a cryptographic puzzle solved by manipulating a number called the nonce.

Once a solution is found the new block is added to the blockchain.

Economist.com

The Merkle tree goes towards the creation of a new block which created once a puzzle is solved.
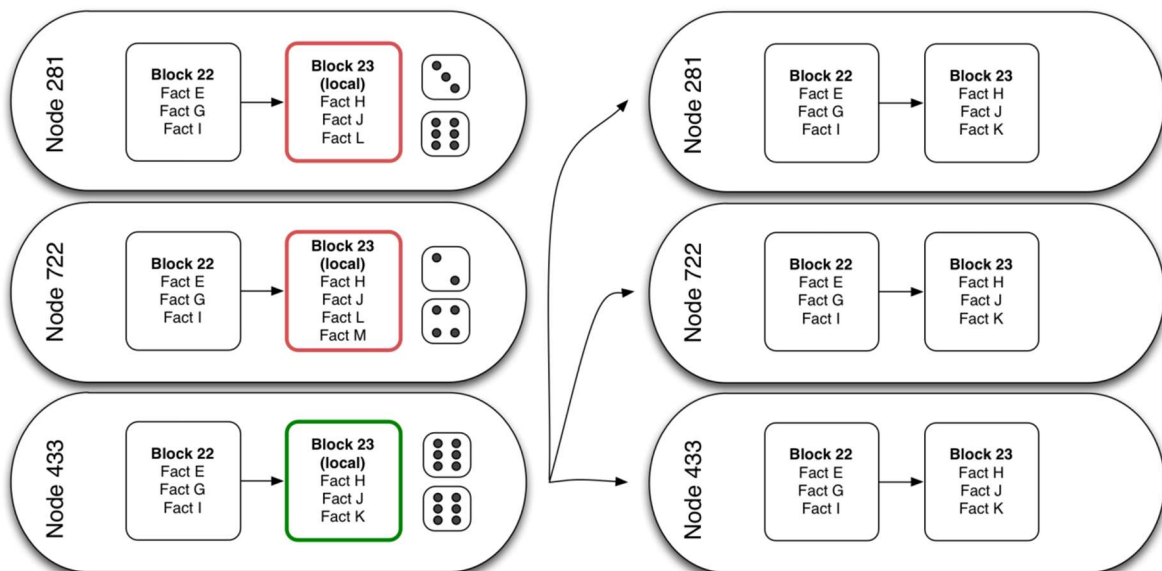
The figure above shows how different nodes (computers running specific software) are competing to solve this puzzle. In this case node 433 wins the prize by guessing the two sixes and block 23 is created.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

10. Technological Fit

There has never been a technology better suited to those involved in community based finance. This is how the man behind the Ethereum blockchain described it:

"A blockchain is a magic computer that anyone can upload programs to and leave the programs to self-execute, where the current and all previous states of every program are always publicly visible, and which carries a very strong crypto economically secured guarantee that programs running on the chain will continue to execute in exactly the way that the blockchain protocol specifies." — Vitalik Buterin

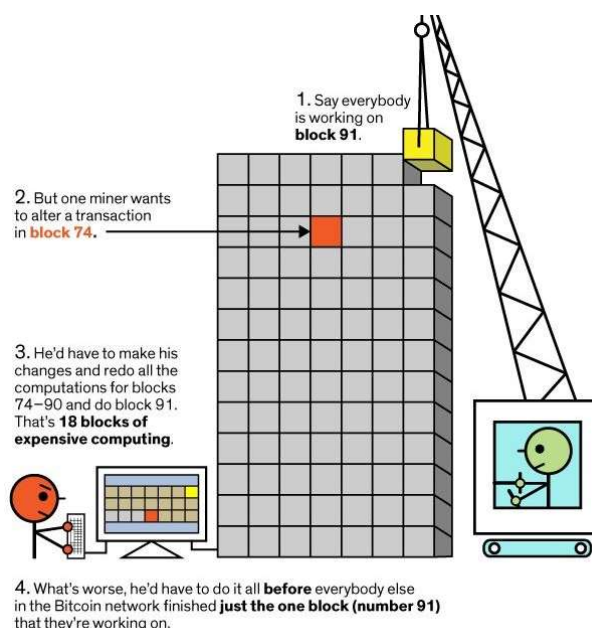So in short you have a system which will run automatically according the rules that have been programmed into it. Every transaction is validated by a cryptographic signing process and once a certain number of transactions are made a new block is produced. This block is then published on the blockchain and provides an irrefutable record of every transaction. If you wanted to alter a transaction you would have to alter every other transaction on all the preceding blocks simultaneously so it extremely difficult to hack.

1. Say everybody is working on **block 91**.

2. But one miner wants to alter a transaction in **block 74**.

3. He'd have to make his changes and redo all the computations for blocks 74—90 and do block 91. That's **18 blocks of expensive computing**.

4. What's worse, he'd have to do it all **before** everybody else in the Bitcoin network finished **just the one block (number 91)** that they're working on.

11. BITCUB Blockchain – More Detail

The BITCUB blockchain consists of the following:-

- A computer programme which operates across multiple computers and other devices such as phones and tablets.

- These computers and devices operate as nodes in the network
- Each node will operate via a decentralised app or DAPP
- The nodes all have the power to cast a vote on a transaction using a consensus algorithm.
- They do so by having the right credentials, performing work and being present to participate in transaction vetting.
- The transaction can be can be monetary or of other value such as community credit or token that can be converted to cash at a later date through sponsorship or used straight away as a value that can be exchanged or swopped for another item or service even when off-line.
- Each transaction/transfer of value will only occur when there is consensus in the community that it is a bona fide transaction.
- The blockchain architecture and transaction vetting cryptography will ensure that the system is safe and secure with minimal risk coming from outside hackers.
- The platform is constantly evolving and will always establish the most appropriate blockchain/DLT 'vehicle' for every transaction based on customer and organisational preferences.

This BITCUB blockchain will be accessible via the most affordable and available phones tablets and laptops in the world today. It will be extremely simple and very cheap to use.

12. TARGET MARKET FOR PRODUCTS

Financial organisations and groups with a strong community focus. This includes credit unions, community development institutions, building societies and community Focused banks.

The 'catch all' term we will use for this market is Community Focused Financial Organisations or CFFOs .

13. BITCUB - FIRST USERS

BITCUB is being developed for CFFO's with a strong community driven ethos who wish to:-

- Eliminate non value added activities and spend time on facilities and services to truly benefit members.
- Replace slow, inefficient and disjointed paper based forms with smart electronic contacts
- Reduce transaction fees
- Reduce complexity
- Improve accountability
- Provide transparency
- Provide a seamless audit trail for compliance
- Reduce workload associated with repetitive tasks
- Reduce the threat from hackers with high level security features

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Beyond that we will serve any community with the intention of building positive value in the community and propagating prosperity.

We will also make it easy for anyone wishing to set up their own CFFO, providing a platform and a range of tools to support their community.

14. Phase 1 – Credit Unions and CUSO's

15. CREDIT UNIONS

The first phase will see us focus mainly on the credit union market. This is an area where the team has extensive experience in working with live customers for 5 years, providing on-line banking and mobile applications.

16. CREDIT UNIONS WORLDWIDE MARKET

In 2014, there were 57,000 credit unions in 103 countries serving 217 million members. The World Council of Credit Unions plans to increase credit union membership to at least 260 million in 2020. Already this has increased to 231 million members in just 4 years, providing further evidence of the growth within this sector.

https://www.woccu.org/impact/mission

https://www.cdfifund.gov/Pages/default.aspx

https://www.ifad.org/documents/10180/6bd3b2b1-a3ba-4a20-9456-8b12f1598a6e

17. REPUTATION AND CUSTOMER EXPERIENCE

Credit Unions all over the world are unique when it comes to the service and experience they give to customers.

This is exemplified by the 2017 CXi Ireland Customer Experience Report where credit unions topped the national league table for customer experience. This is the third consecutive year that credit unions have been voted number one for customer experience in Ireland, coming in ahead of 170 other brands across 10 different business sectors.

Once again this year, credit unions scored highly for integrity, empathy and for their highly committed staff, many of whom are volunteers. Another element in this success with customers is that credit unions are deeply embedded in the local communities that they serve. According to the CXi, credit unions are "a perfect example of a company that genuinely cares about its customers.

https://www.creditunion.ie/communications/news/2017/title,11397,en.php

18. CUSO's

This system is also aimed at Credit Union Service Organisations or CUSO's. This is when one or more credit unions come together to provide a product or services for the industry. This is driven by the desire to reduce the risk associated with the adoption of new systems and share/gain economies of scale from a cost perspective.

19. PROBLEMS TO BE SOLVED

In this new digital age, it can be difficult for Credit Unions and other community centric financial groups to provide products and services that people now expect.

There is also a huge burden from a compliance/regulation/security perspective as central banks and other authorities attempt to protect institutions and their members interests. Included in this is General Data Protection Regular (GDPR) and the Payment Services Directive (PSD2).

Running these operations in an efficient and effective manner can be extremely challenging especially when many of the team are volunteers. These challenges have led to various credit unions either amalgamating or being absorbed into the banks thereby losing their mutuality. In extreme cases they go into liquidation and get wound up (Chareleville Credit Union, Ireland 2017).

Other problems often centre around legacy systems which are not fit for purpose in this digital age. Disjointed systems mostly lead to unnecessary duplication, confusion and this lack of transparency can cause mistakes to be made putting Credit Unions at risk. Systems used by larger banks are often overly complex, inappropriate and expensive to run (up to

$500k for a one off license) . Electronic Funds Transfer (EFT) is still performed through the banks such as Danske and BNP and attract the associated 'middle man' transaction costs and times. It is rare for these systems to be able to perform cross-border payments so remittances (cross-border payments usually back to a home community) are cumbersome and costly. Western Union and other companies have a very lengthy process for transfers and often charge a 10% fee per transfer.

Other issues facing the smaller institutions concern member account liquidity as often they do not provide a current/checking account. This means they cannot compete with banks who offer a broader range of products and services.

Lending controls are another problem and some Credit Unions have gone into liquidation recently because of poor control over lending/deposits/assets ratios.

Relevance to a younger more tech savvy audience can be absent and a barrier to growth as these institutions are sometimes seen as being stuck in the dark ages and not relevant to their generation.

20. SOLUTIONS

Our solution is to provide a flexible, fully decentralised, integrated system which is solely there to satisfy the needs of Community Focused Financial Organisations.

It will be controlled by the members of these communities served by the BITCUB blockchain.

Our BITCUB blockchain will provide smart contacts that self-execute when the required inputs are entered. These will include KYC, transactions, loan applications, savings products, internal auditing, report generation etc. Because there are no middle men in the equation, members will be able to transfer funds to anyone on the planet. This will allow credit unions to offer a new transfer service based around remittances.

Operations performed in the blockchain will reduce processing times, improve the flow and responsiveness for staff and members alike and assist in reducing operational costs. It will allow staff to focus more on value added activities for its members.

The smart contracts will also ensure that compliance is maintained, and alerts are raised if ratios fall outside a certain limit so appropriate action can be taken.

21. Voting on important issues

In credit unions members enjoy equal rights to vote (one member, one vote) and participate in decisions affecting the credit union. The DAPPS will allow members to cast a vote whilst at the same time recording the result on the blockchain as an immutable irrefutable record of that vote. This means it cannot be altered and the system can be automatically updated

depending on the outcome of the vote. This could relate to things such as dividends issued or election of officers.

22. BITCUB Blockchain Benefits

1. Transactions are effected on the blockchain meaning that costly and unwieldy core banking systems can be phased out.
2. CFFO's can offer a full range of products and services to be able to compete with and even surpass the banks.
3. Distributed Apps or DAPPS can provide excellent cross channel interfaces for members.
4. Accounting – because blockchain transactions can be settled in an instant then, all accounts can be viewed in real-time with only a minimal lag for settlement.
5. Reconciliations will be performed on the spot and regulators can get access to this record to ensure compliance. Because it is immutable, they know it has not been tampered with.
6. Credit Union health can be more closely monitored with liquidity ratios preserved.
7. Transactions can be performed without the banking middle men improving speed cost and the usual cross-border delays. This provides a great vehicle for remittances, saving up to 10% of the transaction.
8. Collaborations with other credit unions and CFFO's in other parts of the globe are now possible as they can operate off the same blockchain.
9. The above means that funds can be sent directly to any communities that maybe in need.
10. A community credit system can be introduced whereby education and good deeds are recorded and another block added to the chain when a certain number of credits are generated, thus adding to the value of the community.
11. Lean to Earn system will drive engagement from younger users whilst adding value to the community. Games and puzzles made available on mobile applications which, if successful, will generate an output contributing to the production of new blocks on the chain. These youngsters can start to generate income which will go into their own saving accounts.
12. The DAPPs will be engineered to provide peer to peer transfers without the internet. This means that transaction can take place from one user to another using a smaller number of nodes (or devices) and then settled once a connection is remade to the rest of the blockchain.
13. Last but not least security is improved as there is no longer one central system which can be hacked (ala JP Morgan, Unibank, Target, Bank of America, Tesco Bank, Swift, HSBC etc.). Instead an encrypted system is spread across a set of decentralised nodes.
    This will help with regulations such as Payment Services Directive or PSD2 compliance with the above security protocols. General Data Protection (GDPR) will also be built in from day 1.

    http://news.cuna.org/articles/105948-data-breach-costs-will-soar-to-2t-juniper
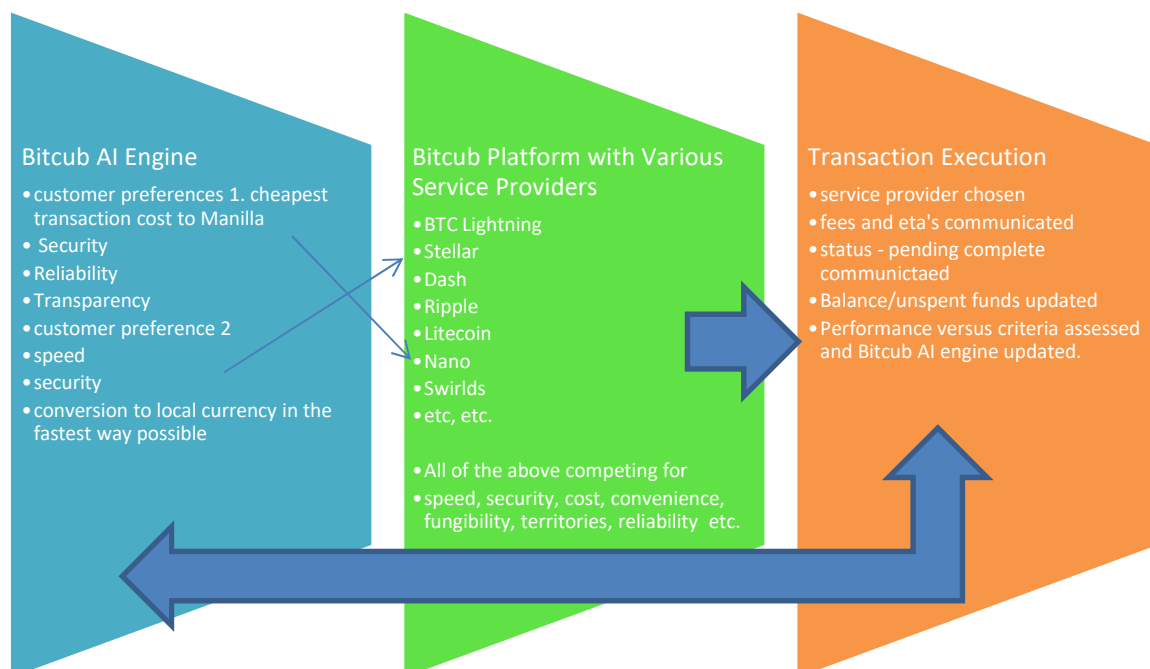
23. SMART DECISIONS & ENABLING TECHNOLOGY

Clever use of technical resources is key to the success of this project. Whilst the current team have years of experience working on the provision of on-line and mobile products to Credit Unions and other clients, it will also work with organisations with a proven technical advantage. 'Wheel re-invention' is not a smart use of precious resources and should be avoided at all costs. Many ICO'S of late have technologies which are no different from what has come before. Because there is a difference in implementation or use of technology does not mean they are better. ICO's can be driven by a desire to raise as much cash in the shortest time possible for the promoters without a long term business strategy and consideration of 'me too products' that they will be competing against in the long term. With so many people doing the same thing and the lack of a screening process filtering and amalgamating the whole process can be extremely wasteful of peoples' time and resources.

We aim to change this approach by inviting firms to collaborate if they feel they have a solution which will provide client benefit and can be integrate onto our platform. This will have a reciprocal effect in driving new use cases for them and adding value on multiple platforms of merit.

The Bitcub AI engine will determine which DLT provides the best solution for each individual application providing a dynamic switching function as customer preferences change.

Bitcub AI Engine
- customer preferences 1. cheapest transaction cost to Manilla
- Security
- Reliability
- Transparency
- customer preference 2
- speed
- security
- conversion to local currency in the fastest way possible

Bitcub Platform with Various Service Providers
- BTC Lightning
- Stellar
- Dash
- Ripple
- Litecoin
- Nano
- Swirlds
- etc, etc.

- All of the above competing for
- speed, security, cost, convenience, fungibility, territories, reliability etc.

Transaction Execution
- service provider chosen
- fees and eta's communicated
- status - pending complete communictaed
- Balance/unspent funds updated
- Performance versus criteria assessed and Bitcub AI engine updated.

In the above example customer 1 has been partnered with Nano because of the zero fees, good security, reliability and transparency of transactions. Customer 2 however has been

BITCUB – WEALTH FOSTERING FOR COMMUNITY

partnered with Stellar who provide quick transaction times and with the anchor network allows conversion to local fiat currencies.

The machine learning and AI characteristics of the system mean that it is dynamic in nature always selecting the best technology for the job. This takes the guesswork out of the process for those individuals in the CFFO's whilst at the same time optimising their fee structure.

The platform will also contribute to driving efficiencies and improvements in general to the different blockchain technologies represented on the platform, rewarding those who succeed in selection being rewarded with more transaction volume.

24. CORE BANKING SYSTEMS

With BITCUB the opportunity exists to replace core banking products.

The main elements of core banking include:

- Making and servicing loans.
- Opening new accounts.
- Processing cash deposits and withdrawals.
- Processing payments and cheques.
- Calculating interest.
- Customer relationship management (CRM) activities.
- Managing customer accounts.
- Establishing criteria for minimum balances, interest rates, number of withdrawals allowed and so on.
- Establishing interest rates.
- Maintaining records for all the bank's transactions

At present core banking systems are generally aimed at the larger banks and building societies.

Examples of core banking products include Infosys' Finacle, Nucleus FinnOne and Oracle's Flexcube application (from their acquisition of Indian IT vendor i-flex).

Fiserv, Temenos, and TCS also do a good job at providing core banking systems for these 1st and 2nd tier entities but they often do not 'scale down' well. This means they are complex and costly for the majority of CFFO's.

Having worked in the Credit Union space for the past 6 years the Bitcub team has encountered Credit Unions who have not updated their core banking system in over 8 years. This can be due to perception of additional costs, time and complexity. Many of these organisations are so risk adverse that hey freeze themselves into inaction leaving old systems ripe for attacks from hackers.

25. Blockchain based Core Banking

Blockchain based systems with a strong emphasis on security, reliability, transparency and accountability provide an ideal alternative to these centralised core banking products.

With self-executing contracts built onto this blockchain, all of the core banking products and services can be provided with greater efficiency and speed.

Not only this, with blockchain payments can be effected with minimal costs and transfers occurring instantly compared to the many days it can take currently as they make their way through the myriad of middle men. In some case funds have to pass through 14 of these before it reaches its' final destination.

These are the core banking areas we will be targeting in the initial stages of the project:

25.1 Opening new accounts

This will made as frictionless as possible with the option of opening an account on-line or on a mobile device.
KYC information will be gathered, processed and stored on the blockchain.
Valuable and sensitive data will be stored securely on the blockchain with sovereignty fully controlled by the member (in addition to being GDPR compliant) .
Optional modules such as fingerprinting and facial recognition will also be provided for quick access to data.
Qualifying information such as proof of address on a utility bill or proof of workplace can also be uploaded remotely by the member. The member will enter into a smart contract and will be informed of any requirements to pass their information onto a third party such as a governing body.

Keeping current

The smart contacts will be programmed to prompt members to update the information on an annual basis to ensure the KYC information is kept up to date. Once an account is opened the public key that is generated can be accessed by the member and used to retrieve account details when in a branch. Additional layers of identity management such as biometrics or pin can be added for additional security. The blockchain will provide a record of every update so there is an irrefutable record which builds the strength of identity over time.

Protection and Control over Personal Data

GDPR

The EU 2016/679 regulation (also known as the General Data Protection Regulation or GDPR) covers the protection of people with regard to the processing of personal

data, and the free movement of such data. It comes into force on the 25th of May 2018 and will give citizens of EU countries greater rights over their personal information, and place greater obligations on organisations to protect this data. It includes the right to be forgotten, the right to know when personal data falls into the wrong hands (e.g. hackers) and the need for explicit consent (in certain cases) prior to processing personal information. If an organisation is found to be in breach of these regulations they can be fined up to €20 million or 4% of their turnover.

PSD2

Payment Service Directive or PSD2 will require institutions to open access to personal information related to customer accounts to third parties which the institution has no contractual agreement with. The big proviso, however is the fact that the customer must provide their consent. It is up to the individual to give consent and to provide the data to the data processor - not a decision made by other processors.

https://www.intive.com/en/blog/articles/psd2-and-gdpr-regulations-on-collision-course

With the BITCUB blockchain a record will be kept of all personal data together with details how it is being used with smart contacts being executed on their behalf to facilitate the provision or prevention of data transfer to a third party. The user will always be in complete control of their data and will participate in systems whereby they knowingly provide this data for a good cause or reward.

It will also be extremely difficult for hackers to access this data as the decentralised nature of the information spread will mean that every node will have to be hacked in the network to access one piece of personal data. For additional data protection the architecture being deployed for BITCUB will be closed for members only and will be permission based.

Additionally BITCUB will incorporate a customer centric architecture, ensuring their data is kept as secure as possible and giving them the ability to combine all of their financial information into one app. It is important to note, however that competing financial institutions can be notoriously slow at sharing data even with legislation in place so a step by step approach must be taken to this implementation.

Either way the fundamental principles of both directives will be incorporated into BITCUB from day 1 making it an industry leader.

KYC Potential Partners:

Culedger are a CUSO who have been working with CUNA. Initially they have been focusing on identifying members who phone into credit unions to verify their

identity, working with Evernym who are a technology solution provider in the identity space.

http://culedger.com/

https://www.evernym.com/

25.2 Making and servicing loans.

Loan Application

Loan calculators are available on-line and on-mobile for many financial institutions. The issue is linking any loan inquiries with the member for a more seamless loan-enquiry to loan application and granting process. At present many community based FI's require a new loan application to be reviewed by a committee. Prior to this bank statements and credit checks must be provided as part of the risk assessment process. This can take some time and is largely cumbersome and inefficient of the FI's resources.

With the BITCUB solution the member would be able to link their KYC information with the loan enquiry and application process, with the relevant cross-checks happening automatically in the background without staff to get involved. If voting and approval is required from the officers then this is accessed via a portal where they can cast their vote.

With PSD2 banks are required to provide access to customers information such as account transaction history to other financial services providers. This will require them to provide application programmable interfaces or API's. So for example if you have an account with a bank and credit union the bank is obliged to make that information to the credit union for loan applications. This will mean that with the customers permission they will be able to access the last three months' worth of transactions and the smart contract can execute to check income in addition to any relevant credit ratings and the ability of the applicant to repay the loan. This seamless process will encourage members to take out low interest loans on a more regular basis and increase good business for the credit union as all checks will have been carried out in the smart contract mitigating risk of default.

Because of user friendliness and back-end efficiencies introduced by the system microloans can be made available more easily.

Any legal contracts can be entered with the smart contract on the blockchain. A Potential Partner in this regard is Integraledger.

http://www.integraledger.com

25.3 Processing payments and cheques.

CHEQUES

Although cheques are becoming less common there is still a requirement to process them. Current optical character recognition methods allows cheques to be captured and processed for deposit into an account. With blockchain there is no possibility that the cheque can be altered and the amount changed further improving the security of the system.

PAYMENTS

With payment processing, if payments are carried out in BITCUB there will be no middle men as the blockchain will process the transaction. This will ensure the fees are kept at a really low level that will encourage the adoption of current accounts and a more 'fluid' financial economy coming from the credit unions and other CFFOs. In a large number of cases people deposit their savings into a credit union, get charged tax on the interest and end up making very little. Why shouldn't they have their money working for them and helping out on more day to day transactions? BITCUB will enable this through payments that will accepted by merchants all over the globe. Anyone with a smartphone will be able to set up as a merchant with transactions occurring when a public QR code is scanned by the payee. They in turn will enjoy reduced transaction fees creating a push pull environment for BITCUB.

It is widely recognised that blockchain based payments are the future. Having said that our model must also support the more traditional payment incumbents in different parts of the world. For this reason we will have a wallet that will support both fiat based payments and crypto payments.

Type 1 Mobile – Fiat based transfers

Mojaloop was created by the Gates Foundation's Level One Project, which is aimed at levelling the economic playing field by crowding in expertise and resources to build inclusive payment models to benefit the world's poor. Alongside Mojaloop's development, the project also brought together four mobile systems companies—Ericsson, Huawei, Telepin, and Mahindra Comviva—to develop an Open API for mobile money interoperability. These APIs will allow mobile money providers to integrate with Mojaloop and products built from it.

Also involved are fintech developers Ripple, Dwolla, ModusBox, Crosslake Technologies and Software Group. They are using the Interledger Protocol, a solution for settling funds among multiple providers across their individual systems. It joins other promising digital financial software, but is the first model that can help extend interoperability from mobile money providers to any bank, merchant or government institution in a customer's economy in a way that specifically meets the needs of the poor.

https://www.gatesfoundation.org/Media-Center/Press-Releases/2017/10/Bill-Melinda-Gates-Foundation-Releases-Open-Source-Software-to-Expand-Access-to-Financial-Services

We will be integrating this payment system into our platform along with our BITCUB token offering crypto to Fiat transfers across a range of different markets.

BITCUB transfers

This is the preferred option for transfers as BITCUB will bypass the banks entirely and get settled on the BITCUB blockchain.

This means that transaction times, middle men and costs will be less allowing the CFFO to establish the most competitive fees for their members.

The Bitcub AI engine will automatically select the best vehicle for transfer based the customers stated preferences.

25.4 Calculating interest

This will be done automatically by the smart contract that the member has signed up to. It will be available for viewing on the members dashboard on their DAPP.

Different rates for the different loans and savings products will be clearly displayed plus their eligibility to qualify for a lower interest rate on a loan or indeed a higher interest rate on certain savings products.

25.5 Customer relationship management (CRM) activities.

With staff member freed up from non-value added activities they will be able to understand and communicate more regularly with members allowing better relationships to be established. A member is made aware of more relevant products and services through more targeted interaction.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

For example the smart contact used for the car loan can generate an output once the loan is paid off that prompts the FI to contact the customer and see if there is anything else that they could provide. This could be a home improvement or education loan. The process would also allow staff to be more proactive in reaching out to members to understand what new products or services they might be interested in. It may also work the other way around with DAPP based two-way communications providing a vehicle for the member to request CFFO to provide sponsorship for their son's football team through the messaging channel, further increasing their involvement in the community.

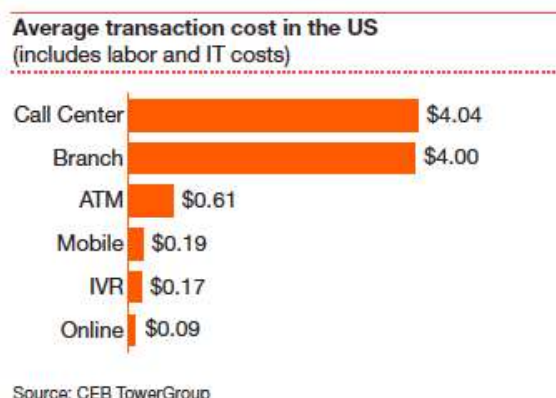## 25.6 Managing customer accounts.

With member dashboards both members and staff themselves will be able to tell at a glance what state their finances are in. An alert will be generated for example if the terms of their smart contact have not been adhered to. This could be a late payment or a change in interest rates.

Instead a paper-based communication this will be communicated via a DAPP reducing cost for the institution involved.

As far as staff is concerned when a member walks in they will be able to retrieve a members account information without a passbook or similar form of account verification. With their app or a paper wallet (printed onto a card or paper) they will be able to scan their public key and retrieve their account once they have input a pin or biometric.

Any transactions between the member and the staff will be recorded onto the blockchain so there is complete account of every element of customer/staff interaction, irrefutable in the case of any audit carried out.

With the use of DAPPs the cost associated with transactions will decrease. In 2010 The Tower Group carried out research into over the counter transaction costs versus some of the new methods.

Average transaction cost in the US
(includes labor and IT costs)

Call Center	$4.04
Branch	$4.00
ATM	$0.61
Mobile	$0.19
IVR	$0.17
Online	$0.09

Source: CEB TowerGroup

With mobile and on-line only costing 3% of the call centre and in-branch costs, there is a real opportunity to extend savings even more when the efficiencies of the blockchain payment rails are introduced.

25.7 Establishing criteria for member minimum balances, associated interest rates, number of withdrawals ETC.

The smart contracts setup will facilitate required minimum balances including alerts if an account is in danger of falling below that level. Interest rates applicable to all loans, savings and current accounts, and eligibility criteria for all loans and savings accounts will also be provided. The number of withdrawals will also be baked into the smart contract and the dashboard will log this for staff and the member where appropriate.

25.8 Credit Union interest rates.

Although Credit Unions in Ireland can charge up to 12.68% for a loan most of them will charge much less than that. Loans can be as low as 4.5% for a savings or a shares account secured loan. It is up to each credit union to determine what interest rates are available to members. Now this is always a balance between giving the members the most competitive rate on the market and ensuring there is sufficient 'coverage' from an admin perspective to maintain and cover the loan costs over it's life. Likewise interest paid on savings must cover administrative costs. In both of these cases the smart self-executing contracts on the BITCUB blockchain will help reduce maintenance fees and ensure the optimum balance is maintained between admin costs and the return for the institution by setting the optimum rates.

25.9 Maintaining records for all transactions

With the BITCUB blockchain every transaction will be recorded as they are happening (virtually real time) and cannot be tampered with after the event. This means that any corrections, amendments or adjustments will be clearly visible and well documented for perusal from members and staff alike. From an accounting perspective reconciliations will be performed automatically so there is no need to perform this function manually.

Matching will also occur automatically so that expenses are recorded when they are incurred not in the period when the payment is made.

The accounting processes build into the BITCUB system will also allow the officers to run reports and assess the information in real time for important meetings and decision making.

It will allow the key decision makers to make the right moves before an issue arises improving the resilience of the organisation.

The smart contracts will also have controls to foster prudence so that assets are not over stated versus liabilities and the balance sheet is a proper representation of the health of the organisation.

It's permissioned based structure will also allow temporary access from regulatory authorities so that compliance is maintained.

25.10 Security- Past and Present

With current server centric systems, the main security vulnerabilities centre around web services and the server itself. The author has been involved in penetration testing of credit union systems and it is generally the case that client side attacks are less common.

Denial of service attacks have been particularly prevalent in recent times as servers get bombarded with requests from malware.

We are giving this serious attention in this project as it warrants delivering the most robust system possible.

25.11 BITCUB Security

The BITCUB team have experience delivering robust systems working with leading penetration testing companies who expose these systems to all manner of attacks.

Working with some of the creators of the OWASP 10 standards it has concluded that the greatest vulnerabilities are with servers and the web servers that connect them.

There is much work that must be completed on the server side to create a truly robust system.

One major advantage of the BITCUB blockchain is that with the decentralised nature of the network there is a lessened degree of attack possible with no 'single potential point of failure' seen with centralised server based systems. It is incredibly difficult to hack a distributed database, and manipulate it to the benefit of cyber criminals. This makes DDOS attacks ALMOST impossible as all of the nodes in the system would have to be compromised at exactly the same time with the correct cryptographic solution and credentials.

The system will be made robust against Sybil attacks (false and hijacked identities) in addition to any attacks that may affect smart contracts. The team will use Quantstamp, Ether Party or equivalent code checking programmes to ensure integrity is maintained. This will prevent the recent compromise on Ethereum being an issue.

25.12 Member Security

Member credentials will only be accessible when their private key contained in their DAPP is accessed with a randomly generated key code application and /or another form of authentication such as a fingerprint or facial recognition. This will help with compliance with PSD2 the Payment Services Compliance directive due to be introduced in 2018.

They will also have the option to store keys using cold storage and paper wallets that can be locked away. Tezos and Ledger hardware wallets will also be supported for additional security so if the member wishes the keys can always be stored off-line.

Cards supplied by BITCUB and issued by the Credit Unions will also have an NFC chip in them that can be used to provide a further factor of authentication.

Up to 7 factors of authentication will be provided for maximum security.

All communications will be enabled through an encrypted system of messages in robust DAPPs bypassing email for communications involving sensitive data.

25.13 COMPLIANCE

The smart contacts produced will allow an operational structure to be provided to meet compliance and governance in a particular jurisdiction.

For example there are certain fitness and probity standards that individuals who perform a control function must comply with in Credit Unions. This is meant to be a screening process to ensure that the officer has the requisite qualifications and is committed to acting with honesty, integrity and for the good of the community as a whole. With blockchain technology and smart contacts the

person will be guided if the task they are performing is outside the boundaries of these regulations. They will not be able to perform a function if it jeopardises the well-being of the financial community they serve. The team will also have an irrefutable record of events so the days of covering over dubious behaviour are gone.

NB: This could also apply to banks where recent tracker mortgage scandals could have been prevented if they were contractually constrained to provide the correct rates.

25.14 STAFF TOOLS

Members coming into the branch will have their mobile apps with their public qr code which can be scanned by the member of staff. Biometrics PIN or other second factors of authentication will then identify them to the staff member and allow them to access their details. The member account will have a dashboard showing the various accounts and any alerts or and special deals or privileges they may be entitled to.

Their eligibility for particular loans will be on the dashboard based on their current credit scores, and the member of staff can then guide them as to how to apply.

The loan application process itself will allow the member to load all relevant documentation onto the blockchain. This will include proof of identity/KYC items such passports driving licence, id card, utility bills, statements etc. Giving the member the ability to load this information themselves will also reduce time and paperwork in the branch. Because they are stored on the blockchain the record cannot be altered so security and reliability is improved. There is also the added advantage of having to cut down less trees to support the current mountain of paperwork that has to be maintained by credit unions.

26. NEW ENGAGEMENT PRODUCTS

26.1. Remittance

This is an area as yet untapped by the majority of credit unions.

Worldwide, 230 million people send $540 billion in remittances each year, primarily using firms like Western Union, Moneygram, and RIA, which together control 1.1 million retail locations and account for more than 25% of the world's annual remittance volume.

https://qz.com/775159/theres-a-500-billion-remittance-market-and-bitcoin-startups-want-in-on-it/

While there are only 60,000 migrant Filipinos working in South Korea—far fewer than in neighbouring Japan—they collectively send home more than $231 million in personal funds each year. That works out to about $300 per person, 50% higher than the global average.

The typical international money transfer requires much communication between the persons on either end of it. They have to calculate exchange rates, synchronize amounts, collect personal details, agree on a transfer method, and then confirm when the cash has been sent and received.

Credit unions possess many of the ingredients to provide a viable and credible alternative.

With the payment processes outlined above they have a new product to market to their members. This is especially useful for people who currently have to transfer savings from their credit union or bank to service providers such as Western Union. It also means that there is a significant cost saving in the fees that are being paid so more of their hard earned money goes home to their loved ones. When users see that these remittances are performed through a service provided by credit unions it will give them credibility and confidence.

It is very possible that credit unions could attract 10% of this market.

The Reasons include …

- Ease of 'cross selling' to existing member base
- Risk reduced for members with credibility and Integrity of a long established financial institution under the credit union brand.
- New technologies can be wrapped up with existing services and made simple by credit unions
- With the credit union being based in a physical location the issue of internet connectivity is removed so they can go in and collect the cash in their local currency when they arrive.
- With the BITCUB Dapp they get a notification of when the funds have landed if they do not have the Dapp they will receive a text message to say their funds are in their account.
- Additional convenience is introduced when the transferred funds are available straight away on the Dapp to purchase goods and services or deposit directly into their chosen credit union savings account.
- Once they have access to the funds they do 'off-line' transfers to others in their community using the proximity transfer system.
- All transactions are conducted by people that are trusted in the community.

As the credit union will have KYC and cash out facilities it provides a one stop shop and much less friction and inconvenience compared to existing processes.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Even if a member does not have an understanding of the technology or access to the internet.

Additional Income Stream for Credit Unions

If the average cost of the sums transferred with the existing providers such as Western Union is 10% this equates to $54 billion in transfer fees. 10% of this is $5.4 billion and spread across the 60,000 credit unions worldwide represents a potential additional income stream of $45,000 per credit union if they are to keep 50% of the transfer proceeds. This could be enough to employ a couple of additional staff (depending on the market) or help maintain profitability. Any excess they make at the end of the year can be given back out to members as a dividend.

26.2. Voting

The DAPP's will have a built in member voting system allowing members to vote on important issues. This will make them feel more engaged.

26.3. Draws and Sponsorship

A big element of Credit Unions in countries like Ireland involves community promoted activities such as car draws whereby people can win cars. The Dapp will improve on the inefficiencies associated with current paper based systems also allow them to partake in these draws. It will also provide a means of all community members sponsoring activities such as football matches or pilgrimages.

26.4. Education

When Robert Kiyosaki realised that there was an absence of education around money in schools he came up with Cashflow game. This was rolled out to schools in the US to very positive effect.

26.5. BITCUB Learn and Earn Apps

Not only will our '*Learn and Earn'* apps provide a similar positive engaging way they will also reward children and families in the process.

The app is downloaded to a phone or tablet. This can be done from the internet or where internet is not available they can share the app via Bluetooth or NFC.

Once downloaded the parent or child selects the age group and then what they would like to learn. This can be maths, English or whatever educational tool will help them generate income in the future. There will be a focus on building blocks so as soon as a child completes 10 challenges they will create another block. For every new block created they will be able to see their contribution.

Elon Musk and Tony Robbins announced a project promoting the provision of learning software for developing countries in the beginning of 2017. The BITCUB team will target these types of initiatives and look for opportunities to partner. Again the BITCUB AI engine will select the best partners on the platform.

Where electricity is an issue BITCUB will work with companies producing renewable energy through wind power or human powered chargers so there is no reason why a child is stopped from learning because of the lack of charge on their device. When they are back 'on-line' ..i.e. when the parent goes to town or a community centre with wi-fi, the blocks that they have produced sync and get credited onto the actual blockchain.

Any coins earned will be put into an account that the parents can access to get food provisions or anything else of value for the family.

This is not just intended for children in the developing world but any child that wants to participate.

26.6. Community Credit System

A credit system will be provided to reward positive behaviour in the community. So for example if someone saves a child from drowning in a river their community can reward them with BITCUB credits. If a child successfully completes a quiz on their 9 times tables then they will earn points which can be converted to currency at a later stage. Direct sponsorship of activities and events will be possible through the system.

27. TECHNOLOGY – CHOOSING THE RIGHT ALGORITHM

It is important to note that any technology deployed will always select the best match for the preferences and criteria set by the user and the individual in the organisation. Wherever possible the mining times and environmental footprint seen in Bitcoin and Ether based transactions will be avoided. Now this should change when Ethereum move to a Proof of Stake algorithm sometime being phased in for 2018 and various other developments such as the increased adoption of the Bitcoin Lightning network. Either way the Bitcub AI Engine will dynamically change to select the optimum vehicle for each transaction or smart contact.

27.1 Selection Protocol

The choice of Digital Ledger Technology (DLT) for both transactions and smart contracts is critical for optimum performance of this system.

27.2 Issues with Current Algorithms

The proof of work algorithms as used by the major players such as Bitcoin and Ethereum can have long settlement times and the mining operations currently consume more electricity than many countries in the world. The miners are the biggest beneficiaries being paid up to 8% to effect transactions.

On Wednesday August 23 2017, miners received $2.3 million in addition to 1,800 bitcoins, or $7 million, totalling almost $10 million for 1 days work. It is only in recent times that these transaction times and fees have reduced. On the 21st of December 2017 the average transaction fee was in excess of $50 USD and on the 21st of January 2018 average transaction times were running at 8 days. These , at the time of writing (3rd April 2018) are now less than a dollar and nine minutes respectively. This is not due to the adoption of the Lightning network (designed to assist with Bitcoin scalability, lowering fees and times) but most due to the fall off in demand since the rally in late 2017.

Mining revenues are largely going to 13 main companies which is not in line with Satoshi Nakamotos' principles of decentralised earnings, designed to be spread across a broader section of the community.

Although the fees and transaction times at present are still less than conventional 'interbank' transactions the above fluctuation proves that it not always the optimum way to transfer from A to B. This is because this scalability element was not sufficiently catered in the original design. In reality all of these systems have to compete with are the current standards of security convenience and costs set by Visa, Mastercard, Paypal networks.

27.3 Settlement Algorithms – A closer look

https://blog.knoldus.com/2017/08/13/consensus-algorithms-in-blockchain/

With distributed ledger technology the algorithms used are designed in a way that achieves consensus amongst distributed nodes. In simple terms the consensus algorithms used are there to:-

- **Determine that that there is sufficient balance in the account or unspent funds to facilitate a transfer of x to another party.**
- **Have a record of these funds and transactions across a statistically significant set of network nodes**
- **Facilitate safe, secure, efficient and reliable and cost effective two-way transactions in a user friendly manner.**
- **Prevent double spend – i.e. the same money going to two or more people.**
- **As they are distributed they should not put power into the hands of a few individuals that can manipulate the system for their own ends.**

With the proof of work blockchain algorithm miners compete with each other expending computational power and electricity to solve a maths puzzle which makes the system robust but does not output any useful work. This required 'activity' makes it very difficult to spoof the system and arrive at a consensus which is not in the interest of the community. For example the Distributed Denial of Service (DDoS) attacks that can be used to shut down a central server or a smaller number of nodes would in the case of the Bitcoin blockchain, require huge computational power and vast amounts of electricity in order to be able to attack all of the nodes in a Proof of Work system. In addition previous versions of the blockchain would have to be replicated and changed to effect a new version of the truth or consensus.

The strengths of such a system lie in it's resistance to attacks but the weaknesses are inefficiency, unpredictability of transaction times and costs, centralised control held by the large mining pools, and volatility versus fiat currencies and other cryptocurrencies.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Examples of currencies using proof of work: Bitcoin, Ethereum, Litecoin, Bitcoin Cash

Proof of Stake

Proof of stake is the second most popular computer algorithm through which cryptocurrencies achieve their distributed consensus. It achieves this consensus at a lower cost and in a more energy efficient way. This done is done by giving voting power to entities called validators that have a certain 'stake' or are vested sufficiently in the currency or token. The validators replace the PoW miners and the number of coins they hold plus the time they hold them for dictates how likely it is that will get to approve the next transaction in the system. If fraudulent transactions are approved by certain validators in the system then they lose their coins. So there is a large incentive to stay on the right side of the system. The other advantage is that in addition to getting rewarded in transaction fees the validators can effectively earn interest on the number of coins that they stake as long as they stake them for a particular period of time. This is little bit like earning interest on your savings.

The downside is the fact that it is more centralised compared to Proof of Work putting the power into a small number of 'wealthy' individuals. In the case of Ethereum when they switch to the Casper PoS protocol later this year the minimum number of Ether required is 1,000 coins which with today's value would be $600,000. This means that the power is the hands of the wealthy. Now the same can be said for Proof of Work with miners controlling the network but the main advantages with PoW are that the system is more energy efficient and transactions are cheaper and quicker. One disadvantage of PoS systems is that can be more vulnerable to attack from hackers and the coin could be classified as a security not a token attracting more severe regulation and turning it into a more identifiable vehicle for taxation purposes.

Overall, however PoS algorithms result in faster, cheaper and more energy efficient transactions giving them some advantage over PoW, but the security must be proven.

Example of Cryto Currencies using Proof of Stake – Dash, Pivx, Stratis, Navcoin, Ark, NEO, OK cash

Other Consensus Algorithms

There are other currencies using alternative consensus algorithms designed to get over many of the issues associated with Proof of Work and Proof of Stake.

Practical Byzantine Fault Tolerant (PBFT) Systems

In PBFT each node maintains an internal storage system. When a node receives, messages the format is checked for validity prior to signing. Once enough same responses are reached, then a consensus is met that the message is a valid transaction.

Byzantine Fault Tolerance and their Relevance to DLT

Byzantine failures refer to common failures in software design, process, quality, and applications. Systems designed to mitigate these effects are attempting to solve the Byzantine Generals problem. This is where a number of generals planning to attack and take a city are faced with conflicting information from a number of sources…reliable and not so reliable. The problem centres around trusting the messengers that are conveying the information, not knowing whether it is in the best interests of the group of generals or not. So for example one messenger with the correct information on the city could have his horse maimed by a bullet as he attempts to convey the pertinent information to the next general. Another messenger who does get to the general has been bribed by the mayor in the city giving false information on the best place to launch the attack. The third messenger like the first has the correct information but gets lost on the way and with that the moment is not seized in time.

Now it is important to point out that this does not apply to Proof of Work algorithms as used in Bitcoin because the validity of each transaction is proven and verified through the blockchain record and the fact that work must be completed and verified by miners to approve the transactions and complete the blocks. Essentially speaking PBFT systems use a completely different system so the robustness has to be achieved in a different way.

In computer speak each 'general' maintains an internal state (ongoing specific information or status). When a 'general' receives a message, they use the message in conjunction with their internal state to run a computation or operation. This computation in turn tells that individual 'general' what to think about the message in question. Then, after reaching his individual decision about the new message, that 'general' shares that decision with all the other 'generals' in the system. A consensus decision is determined based on the total decisions submitted by all generals. The graphic below provides an illustration of how this operates.
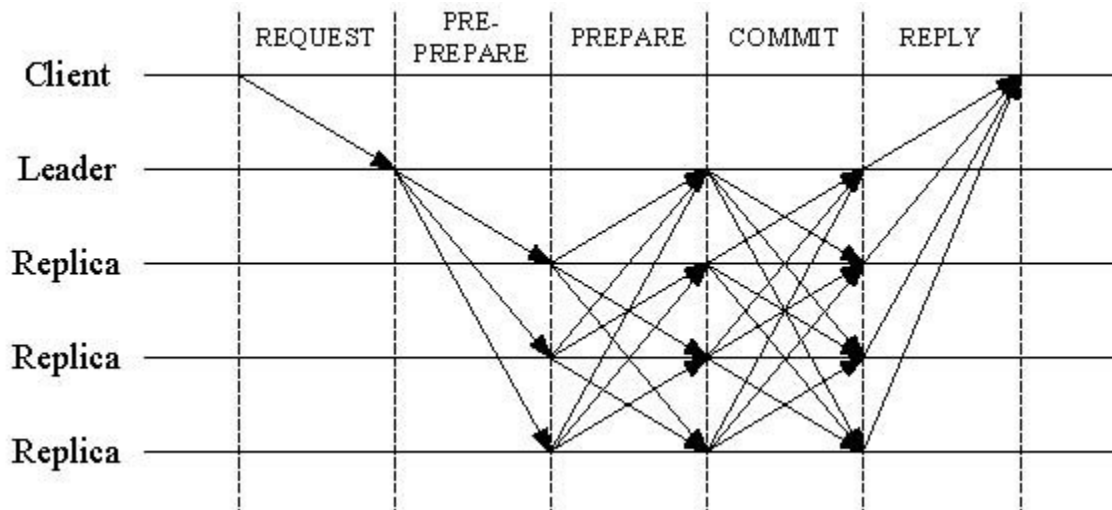
The messenger and general analogy is drawn to illustrate the number of 'reliable' nodes voting in a system. A 'quorum' is established when a certain number of reliable nodes vote on a transaction.

The two main issues with these systems are associated with 'liveness' and 'safeness'. So liveness refers to a node being up and running to make a vote at the right time and safeness refers to how safe and reliable to vote is.

Contrary to popular belief this does not require 51% of all nodes in a system being corrupted or going down but this figure is closer to 33% to account for a worst case scenario (Leemon Baird, Hashgraph) .

PBFT systems are fast and cheap with regards to transaction costs but can be prone to Sybil attacks, where impersonation of a voting entity is possible.

With a Sybil attack a single adversary controls multiple nodes on a network in order to influence voting to their advantage. It is unknown to the rest of the network that the nodes are controlled by the same adversarial entity.

Each PBFT system employed must protect robustly against Sybil attacks as this will always be a security threat and a competitive disadvantage versus PoW systems if not adequately catered for.

https://www.coindesk.com/monitoring-blockchains-stop-sybil-attacks/

In terms of adoption larger IBM/Linux Foundation Hyperledger Fabric uses PBFT in a centralised closed permission based system.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Hyperledger Fabric provides solutions for validating peers; smart contracts (called "chaincode") represent transactions; membership services; pluggable consensus and other aspects. Their PBFT transactions are said to offer low latency, high-speed file storage solutions and many other technical solutions.

Federated Byzantine Agreement (FBA)

Stellar introduced Federal Byzantine Agreements in 2015 under the brand of Stellar Consensus Protocol (SCP)

Like nonfederated Byzantine agreement, FBA addresses the problem of updating replicated state, such as a transaction ledger or certificate tree. By agreeing on what updates to apply, nodes avoid contradictory, irreconcilable states. Each update is identified by a unique slot from which 'inter-update' dependencies can be inferred. Slots may be consecutively numbered positions in a sequentially applied log. An FBA system runs a consensus protocol that ensures nodes agree on slot contents.

Even though most responses from the Horizon REST API use JSON, most of the data in Stellar is actually stored in a format called XDR, or External Data Representation. XDR is both more compact than JSON and stores data in a predictable way, which makes signing and verifying an XDR-encoded message easier.

http://uk.businessinsider.com/ibm-global-payment-blockchain-project-international-trade-2017-10?r=US&IR=T

The downside of FBA according to some recent research is that there is the possibility that malicious forces could, in theory, join an FBA chain multiple times and outnumber the honest nodes. This maybe mitigated by the fact that FBA has a greater ranges of settings than other consensus methods meaning that it can be adjusted to compensate for different operating conditions. It is however, not clear on whether these are dynamic making the system 'self-healing'.

Source

https://cryptoinsider.21mil.com/byzantine-fault-tolerance-blockchain-systems/

PBFT: Stellar, Ripple, IBM hyperledger

Delegated Byzantine Fault Tolerance (dBFT)

Neo formerly [Antshares](), a decentralized Chinese smart contract platform designed to rival Ethereum , uses a version of PBFT called Delegated Byzantine Fault Tolerance ([dBFT]()). Two blockchain participants are employed : professional node operators, called bookkeeping nodes, who run nodes to make money, and users who wish to use the system to effect transactions. The claims are that dBTF offers better security in blockchains because of the bookkeeping nodes ensuring 'correctness'.

dBFT's on-chain voting process dynamically votes in/out transaction validators and allows for universal consensus mechanism on both public/permissionless and private/permissioned based blockchains.
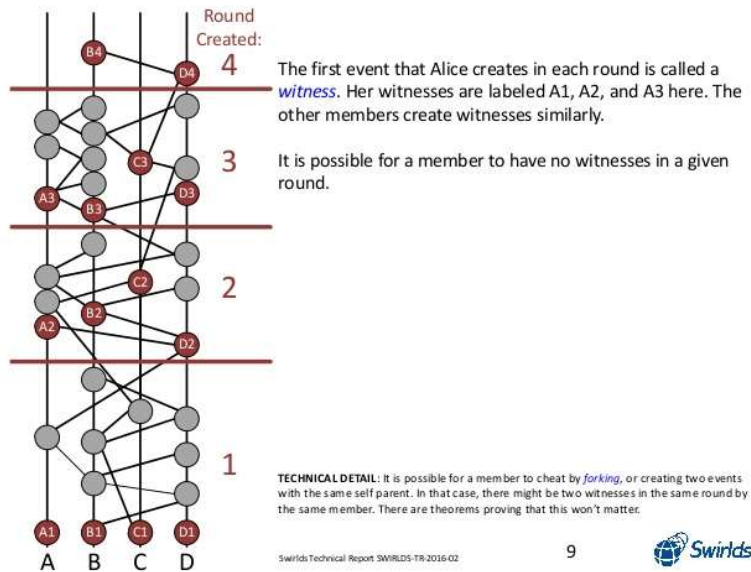
"Specialized bookkeeping nodes" achieve consensus in a dBFT blockchain thanks to "delegated voting." Two-thirds approval is needed among nodes to approve a new version of the blockchain. This system, proponents say, protects against forking events, radical changes to the implementation of a blockchain system that can undermine participant confidence.

Others DLT Technologies

Swirlds

Swirlds uses the hashgraph consensus algorithm, and the mathematical proofs of Byzantine fault tolerance. It does not use blockchain but an alternative distributed ledger technology that is centred around the 'gossip about gossip' protocol. The system shares information randomly about each of the participants or witnesses to validate their identity, validity and their suitability to approve transactions. Rounds are created around events and the whole system is moving dynamically upwards over time, producing an acyclic hashed graph. Each event contains a hashes of the events below and it is signed by it's the event creator. All previous events are immutable so satisfy one of the key characteristics of distributed ledger technology. In the diagram below there are 4 participants, A,B,C,and D each with the ability to create an event with or without transactions. Each participant keeps a copy of this in their memory. The goal of the algorithm is for members to agree on the order of the events and thus the order of transactions.

Round Created:

The first event that Alice creates in each round is called a *witness*. Her witnesses are labeled A1, A2, and A3 here. The other members create witnesses similarly.

It is possible for a member to have no witnesses in a given round.

TECHNICAL DETAIL: It is possible for a member to cheat by *forking*, or creating two events with the same self parent. In that case, there might be two witnesses in the same round by the same member. There are theorems proving that this won't matter.

Swirlds Technical Report SWIRLDS-TR-2016-02   9   Swirlds

The system uses a hierarchy of famous witnesses and a supermajority to vote on transactions. Relationships are a key part of the system with descendants and ancestors linking events and hence transactions together.

Source: https://www.slideshare.net/anupriti/hashgraph-an-over-view-with-example

The hashgraph would appear scalable (stated theoretical up to 250,000 per second) but there has been no communication on the fee structure so we have no idea on how it can compete with existing system. Developed by Leemon Baird, it is a patented, closed permission only based system designed specifically for business to business and bank to bank transactions. This would imply that there will be a large licencing fee to be paid by the institution which could preclude us from using it for our 3rd and 4th tier banking organisations.

That being said the CuLedger project has committed to the platform for its first application CUID to be introduced in the US.

BITCUB AI

Clearly with the large variation in various DLT and Blockchain implementation it is difficult to arrive at an optimum system for a given application. The BITCUB algorithm takes away the

requirement to choose basing each decision for transaction selection on a set of rules programmed into the artificial intelligence engine.

So for example the person sending funds home from Dubai to Manilla may have a requirement to effect the fastest transaction possible, and conversion into local currencies facilitated in the process. The system will default to the most secure and reliable blockchain systems on the platform.

Companies such as Stellar, Ripple, Swirlds, Dash etc. will have to apply to be on the platform and will only be selected once various performance criteria are satisfied. Each solution will be subjected to rigorous quality and penetration testing to ensure security compliance is maintained.

It will be akin to having your hotel listed on comparison sites such as Trivago or Hotels.com, except in this case location, time, duration, quality of hotel, price etc. will be replaced by user friendliness, cost, speed of transaction, reliability, security, fungibility, and appropriateness for those on the receiving end.

The reason for taking this approach is that many of the blockchain organisations in existence and about to be launched at the moment are competing in the same space, i.e. payments/remittances, smart contracts and banking and crypto-spending in the real world. The reality is that with so many of these companies there will be fierce completion and only the strongest will survive. The Bitcub platform will only allow the very best to be available for selection by the AI engine. This will make it beneficial for the end user removing any requirement for them to make an educated decision before choosing an appropriate instrument.

The main criteria will be;-

- Cost
- Speed of transaction
- Security - this must increase with the size of transactions
- Ease of use
- Fungibility – turning it cash or other currency at the destination end.
- Reliability – assessed by the Bitcub AI Engine

The user will provide a scoring for each of the above and the closest match will be made available.

The hierarchy of requirements will be similar to Mazlow's hierarchy of needs with security underpinning everything and acting as a basic need on which everything else is built.
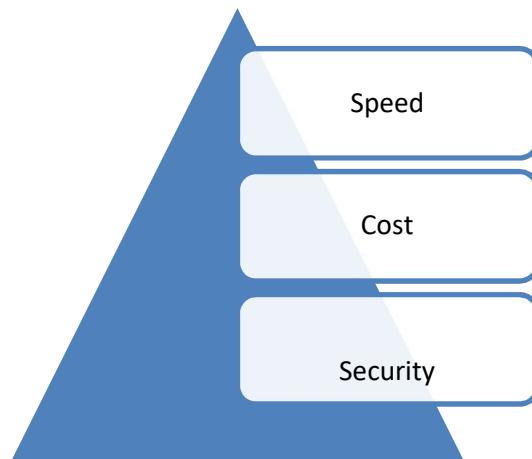
Initially these selections will be completed by the Bitcub team with the top choices for each permutation/combination then machine learning and the Bitcub AI Engine will make these selections with any anomalies being flagged and addressed in the learning process. The engine will always serving according to customer preferences.

Potential Platform Partners

Different applications will require different solutions, with the two main ones centring around payments and smart contracts. Now certain blockchain technologies such as Ethereum have payments built into their smart contract platform but at the moment is not capable of processing the number of transactions that are required for true scaling. For this reason we will have the ability to select from a selection of Blockchain/DLT for each application.

The matrix below shows some blockachain/DLT platforms and how they compare against existing platforms such as Visa and Paypal.

Platform	Time/trns	Speed t/s	Av. cost usd	Security	Usability	Fungibility	Reliability	Proven?
Visa	0.05	56,000	2	8	8	9	9	Y
Paypal	0.05	450	up to 7.4%	8	8	9	8	Y
Bitcoin	498 v	7	1.07 V	9	6	6	7	Y
Etherium	14	20	0.188 V	7	6	6	8	Y
Ripple	3.3	1,500	0.0017	8	7	7	7	N
Stellar	3	2,000	0.003	7	7	7	7	N
Dash	3-900	48	0.128	8	8	7	6	Y
Litecoin	150	56	0.146	9	7	6	6	Y
Bitcoin C	600	56	0.055	9	7	7	6	N
Eos	0.5	300,000	0	7	6	6	5	N
Nem	3	4,000	0.29	7	7	6	5	N
Neo	20	1,000	0	7	6	5	5	N
Nano	3	7,000	0	7	7	5	5	N
Monero	1,560 v	1,700	0.4998	9	5	6	7	N

The algorithm will be constantly looking for the best match using real time data on transactions from the blockchains themselves in addition to the most reputable sources such as bitinfo charts. This will be done via blockchain plugins, API's and if necessary scraping sites for information. Qualitative inputs via sentiment analysis as well quantitative will be employed.

As part of this process it is necessary to benchmark any new payment technologies against the current incumbents. Here is selection.

Payments Sector Analysis

Paypal

Although payment times would appear to be instant as far as the Payer is concerned the funds may take up to 8 days for the Payee to be able to spend the funds.

Banks

Some card transactions will appear as pending on your account until the payment is fully processed. Generally it takes about 3 to 5 business days to process a transaction, although it can take up to 10 business days or longer. During the time a transaction is pending the transaction amount is deducted from your 'available funds,' but your 'account balance' is not affected.

https://www.commbank.com.au/support/faqs/1209.html

Bitcoin

The current market leader but the current version can only support 7 transactions per second so is currently being used as an investment/store of value.

Stellar Lumens

Stellar is receiving much attention of late and a recent partnership with IBM caused the currency to spike.

It's new commercial arm lightyear.io which uses the stellar system also has backing of Stripe.

http://fortune.com/2017/05/11/lightyear-blockchain/

With Stellar's open financial protocol, transactions are settled in almost real-time (3-5 seconds), for fractions of a cent, and can be converted to local currency using a system of 'anchors' which are conversion services provided by the banks at the destination end.

Ripple

Similar to Stellar this more bank centric currency was conceived by Jed McCaleb as a currency to improve 'cross-border' payments. It essentially provides a more effective linking and settlement system between banks in different parts of the world. This makes it a contender as the fungibility element scores highly for those wanting to convert quickly into a local currency. Transaction costs are 0.0001 c and speed.

Sources: https://www.fool.com/investing/2018/02/01/3-cryptocurrencies-processing-1500-or-more-transac.aspx

Other selection parameters

Green credentials are becoming more important for those involved in the crypto currency space as people realise how much more energy efficient these payments channels can become .

The reality is that any credential must be compared to current systems such as those operated by the banks and card companies.

This will be one of a series of preferences along with those listed in the chart above, that can help with the creation of a more ethical payment system.

https://hackernoon.com/the-bitcoin-vs-visa-electricity-consumption-fallacy-8cf194987a50

Smart Contracts

For smart contacts the BITCUB AI will run a script to evaluate the integrity of the contracts, automatically checking for errors and fixing them. This will mean that manual testing and checking of code will be cut down to 10% of current testing times.

Technology similar or exceeding Quantstamp, Ether Party or Agrello will be used.

28. Business Model

DISTRIBUTED BUSINESS MODEL

Modules

Credit Unions will be charged a fee based on modules deployed, the number of members, assets and the volume of transactions. A smart contract will calculate the fee and this will be paid monthly. The package can be upgraded at any time and there will be enhancements made based on member feedback, new requirements for efficiency improvements and regulatory requirements. For every product or module deployed a credit will be paid to the CFFO in the form of BITCUB tokens which they can use either as an investment vehicle or to get a discount against future products licensed.

This licencing fee will be very competitive with existing systems which can be €1 per member per year. Economies of scale will come into play as they will benefit from further cost reductions by using more of the available modules. CUSO's can also benefit as they employ these module across multiple organisations. Getting a small percentage of every transaction.

Transaction Charges

With BITCUB we want to ensure that transaction 'friction' in terms of cost, speed and usability is kept to an absolute minimum. Although free would be ideal for members a small fee will make users value the service more and will help prevent spamming.

The plan is to charge a fee of between 0.0001% and 1.5% for transactions. This fee will be dependent on the size of the transfer and the type of account held. This will be calculated by the smart contract associated with the individual, with new contracts being automatically generated when circumstances change.

50% of all transaction fees will go to BITCUB to maintain and upgrade the network with the other 50% going to the CFFO.

BITCUB Turnover

If every credit union member were to spend $1 a year for these services the annual income for this would be $220 million. The intention is to have 10% of this market in three years going to 30% or $66 million in 5 years.

10% of BITCUB company profits will always be used to fund community based projects that help alleviate the poverty cycle that community members can get trapped in.

Coin on the open Market

BITCUB will have the potential to be seen as an appreciating asset as crypto currencies continue to gain in popularity with more use cases coming onto the market. The appreciating value of the top crypto currencies will have a 'pull' effect on BITCUB which can be linked to the growth in these markets.

Business Development and New Products

The plan is to continue to develop relationships with credit unions and representative organisations on a global scale offering new products every three months to spike interest. These announcements will be made in the trade publications and at various conferences and in so doing raising the profile, increasing credibility and increasing the value of the currency.

Credit unions and CUSO's who invest in the tokens will be able to take advantage of their discount rate for the purchase of products and services into the future.

The BITCUB team will be carrying out education sessions at the World Congress of Credit Unions event in Singapore on the 15th of July 2018 where it will launch its' full Token Sale.

28.1 RISK FACTORS

With any new project there are risk factors. We have listed a few of these below along with methods we can mitigate them.

Conservatism on the part of credit unions

Risk aversion is a key issue when it comes to finance. We will be focusing on demonstrating how using the blockchain and smart contracts can actually help in mitigating these risks and offer improved inclusion on the part of their members.

We will be demonstrating how blockchain technology compares to existing systems by initially running them alongside so trust and confidence in the technology can be built up over time without effecting current 'core' systems in any way. This will be achieved with our community credit system and our smart contract for loan applications.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Not enough early adopters

Lack of good marketing, education and or relevance/benefit to CFFO's could be barriers to early adoption.

For this reason, it is planned to have series of educational talks at CFFO events with Youtube videos explaining BITCUB and its benefits.

Providing a free BITCUB app for children will build awareness and promote engagement.

The team will also be involved in activities that will help education flow from crypto communities to CFFOs as the benefits of the technology and the potential returns on their ICO investments come to the surface.

Too Many ICOs at the moment

There may be a proliferation of ICOs at present but some recent examples show how ICO targets can come short of the mark.

It is not a question of getting as many people to buy into the token sale as possible but getting the right people to invest. This will help prevent the pump and dump mentality that can often dominate the ICO market. Whilst we acknowledge that there will be fluctuations in the price of BITCUB tokens in the early days i.e. when the initial excitement around the token sale is followed by a slump, it is the intention to target the right investors by being more intelligent in our approach.

Many ICO's are Focused on the usual channels such as Coinmarket cap, bitcointalk etc. Ours will also focus on more traditional and trade based communications to attract people that maybe completely new to the world of ICO's, taking the mystery out of blockchain and getting straight to the benefits.

User Generated Blocks

The fact that blocks can be created in all sorts of different ways will add to it's value and longevity.

29. Development Approach

1. Produce a mobile wallet that can be used all over the globe
   a. Wallet features
      i. Send and receive 'sponsorable'* BITCUB community credits
      ii. The credits will be rewards for a job well done or good deeds and will also provide a test platform for currency platforms.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

iii. Access contacts on your phone for messaging within app similar to whatsapp
iv. Each app download will generate a unique set of public and private keys
v. Private key is kept secure and private on the phone or an off-line device while public key is combined with your profile and made available when a contact request is made.
vi. Contact exchange available via messaging system in app which can go locally via camera scan or over Bluetooth, NFC or wi-fi network (both parties would have to have app for this to work)
vii. Off-line peer to peer capability - Priority for exchange of contacts, credits and currency will always be given to the lowest cost option i.e. Bluetooth, NFC first and possibly wi-fi direct.
viii. Contacts linked with public keys generated by wallet in the app that are then communicated to people on user network
ix. The usually problematic and difficult to comprehend public and private key generation and exchange are eliminated and everything is handled by the app.
x. Biometric app access is standard backed by pin and random code
xi. All transactions are subject to inputting fingerprint backed up second or third factor authentication if required. Google authenticator also an option as it maybe preferable when phone or internet access is not available.
xii. Messaging system to be linked to organisation such as credit unions so that global notifications and individual messaging can be facilitated.
xiii. All communications will be encrypted for security
xiv. JARS Money Management System to be incorporated in phase 2– see appendix

2. Use the Ethereum testnet to develop fist loan application based smart contracts.

   a. Loan application
   b. Savings account
3. Use optimum KYC technology for registration & authentication
4. Provide special blockchain based accounts for members initially for smaller amounts to help build confidence in system. This will run alongside existing accounts to begin with.
5. System Integration to be optimised for above using API's and other blockchain technologies where appropriate.

BITCUB Tokens

Individuals and organisation investing in BITCUB Tokens will benefit in the following ways:-

- Equity in the BITCUB organisation
- Dividends paid out when targets are met
- Voting rights
- 20% Reduction in licencing fees for CFFO's
- An asset that has the potential to increase in time like other crypto currencies

Token Supply: 500,000,000 BCU

There will be no more tokens issued. This will create a scarcity value helping to buoy up the coin price.

1 BCU =0.01 Ether or ~$6 USD (at time of writing)

Token Allocation: -

- 20% BITCUB Team
- 5% Reserve
- 5% Community Credits
- 70% Token Sale

  Use of funds
- 5% Admin
- 50% Development
- 40% Marketing
- 5% Security, Compliance and Legal

30. ICO MARKETING AND DISTIBUTION

There are two strands to the target market for these products. The first is the tech savvy ICO investor/Trader and crypto coin collector and the second is the potentially more conservative credit union officer who may not be as 'au fait' with the technology and potentially nervous having heard about the recent misuse of Bitcoin for nefarious purposes in recent times.

31. ICO Tech Trader (ITT)

For the ITT it is a question of engaging with a product that has technical merit, a global market with useful applications all backed by a strong team. There are two types of investors within this category. The first are the individuals taking advantage of the huge swings in cryptocurrency pricing (rarer these days when trading more traditional stocks)

to make big gains by selling post ICO. These 'investors' are otherwise known as the 'pump and dump investors'. They may have good reason to divest quickly post ICO, for example they may not see the long-term viability of the proposition any longer, they start questioning the team and their actions but in the main their sole focus is on making money as quickly as possible. They are not really that interested in the company and the backers as long they get out quickly and make a profit.

The second type is the investor who would typically invest in the longer term plays such as Bitcoin, Ethereum, Litecoin and Ripple. Overall, they see a big advantage in sticking with these main coins and time gives them confidence in the platform.

Many individuals in the crypto currency investing space are a mixture of the two with their short and long-term bets. In either case we need to offer value and create confidence in their investments. Although the bias will be towards the longer-term investor we would also like to create some demand from the shorter-term investor to create 'some' urgency.

The ultimate aim with BITCUB is to create a solid brand that is associated with trust and reliability with good returns for its' investors and members alike. As the products and services continue to roll out and be of benefit to the communities they serve this help the price of the tokens appreciate over time.

32. Community Finance - Stakeholder

The objective here is to target the more conservative credit union officer who is looking for gains beyond investment and the ICO. These longer term 'beneficiaries' will take educating and will also require endorsement from other parties. For these it is good to emphasise that banks are signing up to use blockchain products such as Ripple and Stellar Lumens.

Of further interest is the fact that many banks are now involved in Block chain proof of concepts. A few are listed below.

28 of the top 30 banks are now engaging in blockchain proofs-of-concept

It is also worth riding on the coattails of initiatives from established such as CUNA where certain advocates such as Richard Meade (COO) is an advocate of Blockchain technology.

http://news.cuna.org/articles/110542-cunas-meade-breaks-down-game-changer-that-is-blockchain

http://culedger.com/

The recent announcement by Goldman Sachs outlining their plans to start trading Bitcoin will also give confidence to those more hesitant about getting involved.

33. Current Team Traction

The fact that the current team have been delivering on-line and mobile banking solutions to the top credit unions in Ireland and the UK since 2012 should give these officers added confidence. 16 of the top Credit Unions in Ireland and the UK are using on-line and mobile banking products produced by the team.

34. Compliance Regulation and Security

The team are actively talking to regulators in this sector, ensuring that key fundamentals of sound operation are adhered will boost the project into the future.

All central bank requirements for example will be built into the smart contacts making regulatory compliance automatic, with no non-compliant items getting past the 'gatekeeper'.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

PSD2 and GDPR will become a reality in 2018 and BITCUB will be able to use these as vehicles for promotion with the announcement that all of it's products will be compliant even before the requirements become law.

The team will also be compliant with AML, KYC and PI or PISP regulations.

35. Languages

The language will have to be 'translated' in many instances so that it as jargon free and as relevant to their pain points as possible.

Trade shows and CUNA, ILCU, ABCUL demos will be key in gaining familiarity and confidence in the system. They may also be buoyed by the fact that the ICO has been successful and has raised a significant amount of backing from the cryptocurrency investor community.

36. ICO and Marketing of Tokens

The marketing of the tokens will be conducted using a combination of trade organisations websites news articles, blogs and conferences where we will be doing live demos of transactions on mobile, tablet and desktop. We will also be doing peer to peer transfers off line (sans internet).

There will be two parts to the ICO. The pre ICO and the ICO itself.

36.1 Pre-ICO

The pre ICO is to enable the team to market the ICO and to develop some MVP's which can be demoed to interested parties prior to the ICO.

The target is to raise $2 million where genuine parties can benefit from a bonus of up to 20% extra on every purchase.

Token Supply: 500,000,000 BCU

Our plan is the get listed on the following sites;

coinschedule

https://www.smithandcrown.com/

http://icorating.com/

Bitcointalk.com

BITCUB – WEALTH FOSTERING FOR COMMUNITY

36.2 ICO Timing

Pre ICO: From 4th May 2018

ICO date: 29.06.2018 — 30.09.2018

ICO Summary

Token Supply: 500,000,000 BCU

1 BCU =0.01 Ether or ~$6 USD (at time of writing)

Token Allocation

20% Team

5% Reserve

5% Community Credits

70% Token Sale

Use of funds

10% Admin

50% Development

40% Marketing

5% Security

5% Compliance and Legal

36.3 PARTNERS

Technology partners

We will have an open invitation for technology partners who believe they have the best technology solution for individual BITCUB modules.

Chosen technology partners will be allocated tokens based on the value they bring. This will come from the fund set aside for Development.

This will turn into a major competitive advantage for BITCUB as our eco system will lean to the survival of the fittest.

The team are open to collaborating with those listed in this paper in addition to any others that have a distinct competitive advantage.

Business Partners

The following is a list of business development partners:

- Credit Unions
- CUSO's
- CFFO's
- Fintech Providers
- Banks

36.4 DEPLOYMENT

Our first product will involve the delivery of a product aimed at getting people used to sending and receiving credits in the digital world.

It will be a product that both educates and allows people of all ages to get community credits for their actions.

36.5 BITCUB APP V.10

Features

- **Register for account**
- **Get additional CC's if you are a member of a CFFO**
- **Login with finger print or PIN**
- **Access your contacts and send and receive friend requests**
- **Message people who are in your contacts**

- **Send and receive community credits to any contact**
- Show multiple wallets – select by swiping left and right – Android only for the present, Apple require additional approval for the next stage

Version 2.0

Typical Credit Union Accounts first i.e. loans, savings, share accounts, then BITCUB, bank accounts, Bitcoin

Show total net worth on top of page – adds up all of your wallets into your local currency (will always default to local currency – can be changed in setting)

Logic required to link with appropriate API, convert all currencies and then add them to give a total

https://www.cryptocompare.com/api/#introduction

36.6 Learn and Earn App

The lean and earn app (see appendix) will involve educational games and graphics and a blockchain creator that goes towards building themselves and their community.

37. ROADMAP

2017

December 18th Release White Paper

December 19th Launch Development Website

December 22th Launch version 1.0 of BITCUB app on Android

2018

January 2018 – Employ additional development resource and commence smart contact platform development.

March 2018 – Create BITCUB token, test on testnet, commence machine learning platform selection.

April 9th Complete Development of i OS application – submit for review

May 7th Start Pre-Sale for tokens, ramp up marketing

May 9th Start work on applying for a full banking licence with partners in the UK and US

May 15th Get Apple approval for first community credit app

May additional tasks :-

Get feedback from Existing Credit Union officers and members at special Blockchain information evenings (Done in conjunction with Bank of Ireland Workbenches)

Start social media channels, + Reddit, Youtube, Medium,

Release Apple version of CC application

Make BITCUB tokens available

Continue building team – use Indeed to generate interest and start attracting the best minds

Campaign to focus on GDPR compliance and penalties and how blockchain can help.

Deliver a fully functioning on-line system with fully GDPR compliant KYC and PSD2 ready functionality.

Start working with existing providers and consultants in the Community Finance space.

Attend networking events to increase awareness of the up and coming ICO.

Start spreading the word on community credits can be sponsored and allow people to benefit financially from the performance of 'good deeds'.

June 1st – Attend and show, present at Bitcoinference Brusells

June 4th Ramp up for Singapore World Congress of Trade Unions show

Deliver on-line and mobile test accounts for Credit Unions who wish to trial the system

Increase pace of Marketing campaign for ICO. Get a dedicated marketing person on-board

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Get 2 more developers on the team looking after API's and integration with existing back-end systems

July 1st – Deploy first smart contact/DLT based loan management system for cloud

July 15th -18th – World Congress of Credit Unions attendance and Presentation

Organise meeting with key players in the credit union market in the US and Australia

September 10th Launch BITCUB Kids Credit App

September 30th – First Credit Union pilot with smart contract loan module

October 15th Introduce the JARS money management app for credit unions

November 30th Deliver new range of apps that allow proximity based credit swaps independent of wi-fi or phone network

December 15th – First blockchain based current account available in the cloud for beta testing

December 20th – Full OWASP 10 Security testing for platform

2019

February 28th – DLT based savings account complete

May 20th – Full banking 'blockchain in a box' or BIAB platform available to all credit unions worldwide

May 30th Start a virtual credit union to assess viability. Provide free accounts to all token holders.

May 15th – Building society association AGM sponsorship

June 29th – 10 Credit Unions using our BIAB platform

July 2019 – PRA granting of full banking licence

September 17th – Launch second fund-raising round for key global partner alliances

November 21st – Make BIAB software platform available to all ATM operators worldwide.

2020

January - Launch campaign target all CFFO's who are coming to end of their licencing period with current suppliers.

March – Start BAI academy for developers

June – Enhance community credits sponsorship platform so that everyone in the world with a smartphone performing a good deed can earn.

Appendix (see pdf for notes on Appendix)

Mobile Apps – Functionality

The BITCUB family of Mobile Applications will be edgy but refined in their design with the main focus on ease and speed of use.

Main features

Architecture

Distributed Application or DAPP

Design/Ux led

Striking and engaging

Images replacing text (wherever possible)

Kids play – so easy to use

Main Accounts App

Home screen-

Balance

Will show total balance

When clicked on it will show all BITCUB at the top then up to 10 currencies fiat and crypto below. The user can add their local currency to this list and have it near the top. It may be possible to have location services default to their local currency.

Give

Select people from contacts, groups or someone nearby with Bluetooth nfc or qr code

Select amount and currency you wish to send them (

Press send

Receive

Three ways

   a. Earn – kids earn by learning do sums, words answer questions correctly to earn points. Once a problem is solved on the device these will go towards the building of blocks in the CFC blockchain. These then get turned into bitcub currency. There will engaging animations when a question is answered correctly and another block is created.

1.   Produce a mobile wallet that can be used all over the globe

a.   Wallet features

i.   Send and receive 'sponsorable'* BITCUB community credits

ii.   The credits will be rewards for a job well done or good deeds and will also provide a test platform for currency platforms.

iii.   Access contacts on your phone for messaging within app similar to whatsapp

iv.   Each app download will generate a unique set of public and private keys

v.   Private key is kept secure and private on the phone while public key is combined with your profile and made available when a contact request is made.

vi.   Contact exchange available via messaging system in app which can go locally via camera scan or over Bluetooth, NFC or wi-fi network (both parties would have to have app for this to work)

vii.   Off-line peer to peer capability - Priority for exchange of contacts, credits and currency will always be given to the lowest cost option i.e. Bluetooth, NFC first and possibly wifi direct.

viii.   Contacts linked with public keys generated by wallet in the app that are then communicated to people on user network

ix.   The usually problematic and difficult to comprehend public and private key generation and exchange are eliminated and everything is handled by the app.

x.   Biometric app access is standard backed by pin

xi.   All transactions are subject to inputting fingerprint backed up second or third factor authentication if required. Google authenticator also an option as it maybe preferable when phone or internet access is not available.

xii.   Messaging system to be linked to organisation such as credit unions so that global notifications and individual messaging can be facilitated.

xiii.   All communications will be encrypted for security

xiv.   JARS Money Management System – see appendix

NB: There is already interest by organisations such as UNICEF in Blockchain and they are currently investing in start-ups.

https://www.coindesk.com/no-token-response-unicef-is-open-to-doing-its-own-ico/

b. Send someone in your contacts a payment request
c. Send one person or a group of people your avatar (public key) and tell them how much you would like to receive for a particular item. It could be a loaf of bread or a pen or a new tablet.

Platforms

Works across a range of different devices from old to new

Peer to peer network

Aim is to no have no words just images so it can be adopted internationally quickly.

Bluetooth NFC so it's not reliant on the network or internet

Off line peer to peer transfers with x number of people authorised to sign off a transaction at a local level before it's fully authorised when a connection is re-established on one of the devices

More information on Blockchain and banks

Blockchain technology is now being adopted by forward thinking banks and other organisations realise the advantage of a distributed incorruptible system providing transparency and lowering transaction costs and times.

https://www.jpmorgan.com/global/Quorum

The core innovation of blockchain is digital trust, provable and intrinsic to the system without reliance on an external authority. Similarly, open source code can be transparently vetted and validated to ensure it does exactly what it says it does.

2 of the Most Popular Platforms

Ripple

Stellar Lumens

Stellar is a nonprofit that has developed a blockchain-based platform for remittances, micropayments, and mobile money that FSPs can integrate with directly to lower the cost of transactions and provide instant settlement.

Stellar Lumens. Transactions have a very minuscule fee of $0.000000421240 to prevent network spamming and denial of service. Transactions send and confirm in just a few seconds. It's also a trusted coin in the Top 20 market caps.

https://www.stellar.org/lumens/stellar-partnership-grant-program/

Banqu

BanQu works by connecting the unbanked to the global economy through a secure, immutable, and distributed ledger of financial and personal records using blockchain technology. Since 60% of the 2.7 billion unbanked people already own mobile phones, these devices make the best platform for these people to connect to the global economy.

Lowest transaction fees

https://www.reddit.com/r/CryptoCurrency/comments/6fan75/whats_the_altcoin_with_the_lowest_transaction_fees/

http://aidoskuneen.com/

Zero transaction fees

ZEC – Zcash

Zcash is a relatively new kid on the blockchain, having been launched less than a year ago. Like Bitcoin, Zcash is an open-source cryptocurrency designed for payments transactions. However, it incorporates some unique technology and functionality that provide strong privacy protections. With the Bitcoin blockchain, there is a complete historical record of all bitcoin transactions associated with every address. Transactions in Zcash, however, are published to its blockchain but the sender, recipient, and amount of a transaction remain private.

Zcash does this by leveraging a new type of zero-knowledge cryptography called zk-SNARKs. Zero-knowledge cryptography, as the name suggests, allows one party to prove to another that something is true without revealing any other information. This type of functionality appeals to banks and financial institutions that wish to leverage blockchain technology but are concerned about privacy and confidentiality.

In May 2017, J.P. Morgan and Zcash announced a partnership whereby they would work to integrate Zcash's zero-knowledge security technology into J.P. Morgan's Ethereum-based Quorum project.

Source

https://www.greenwich.com/blog/cryptocurrencies-find-niche-financial-services

Credit Union Technology Providers in the US

WWW.CDW.COM

https://www.alogent.com/credit-union-solutions

https://flexcutech.com/

http://finovate.com/fiserv-wins-trio-new-credit-union-partners/

http://www.cunastrategicservices.com/technology

http://www.open-techs.com/About

ICO Advice

Michael Terpin, who has advised 30+ ICOs, including well known names such as Ethereum, Factom, Augur, Golem and Gnosis, either personally or through his company Transform Group, explains his ICO formula for success,

Here are some examples of attacks:

CitiGroup

In 2011, the attack on financial services provider CitiGroup was notable for the lax security it exposed in the company's online platforms. By repeating the way the URL changed when credit card customers entered a valid username and password, the hackers were able to access the accounts of more than 200,000 people, stealing names, addresses and account numbers, and making off with $2.7 million. Widely considered a catastrophic failure of basic security, this attack underlined how most attacks result from weaknesses in online infrastructure.

Global Bank Spear Phishing

Spear phishing attacks plant malware on a system using spam email in the same way an ordinary phishing attack does. The difference is, spear phishing attacks go to much greater lengths to make their email seem genuine and harmless by imitating recognised, trusted sources. Starting in 2013, a wave of spear phishing attacks targeting some of the world's biggest banks and financial institutions is estimated to have stolen up to $1 billion. After two years, the attack was eventually detected, and was traced to organised crime syndicates operating from Russia. The malware used in the attack, which allowed the hackers to impersonate bank staff to transfer funds, sat in IT systems for months on end sending sensitive data to the criminals, and was so sophisticated it even allowed the gang to watch what was going on in the bank offices via web cams.

Mt Gox Bitcoin Exchange

Bitcoin operates a series of exchanges, which are web sites where people can swap ordinary currency into Bitcoin. In February 2014, the Mt Gox exchange, at the time the biggest in the world, suddenly ceased trading.

The exchange had been bankrupted by the theft of some $460 million worth of Bitcoin currency, probably over a period of several years. Following an investigation,

it was discovered that hackers had broken into the Mt Gox customer database, stealing the usernames and passwords of 60,000 people, and using them to get into the system to steal currency. The lesson here was that although Bitcoin itself is virtually impossible to hack the exchanges operation similar servers to the banks and other exchanges because of their centralised nature are easier to hack. Distributed exchanges do not suffer the same problem.

JP Morgan Chase

Hackers hijacked one of -JPMorgan Chase's servers and stole data relating to millions of the bank's accounts, which they allegedly used in fraud schemes yielding some $100 million.

Bangladesh Bank Heist

In 2016, what would have been the single biggest case of bank robbery in history, online or otherwise, was ultimately brought down in the most mundane of ways – a strange typo on a fraudulent transaction raised the suspicions of a vigilant employee. But the Bangladesh Bank heist was noteworthy for how the attackers got into the bank's IT systems. The story caused huge concern because the attackers had managed to hack the SWIFT global monetary transfer system, giving them free rein to make withdrawals under the protection of the supposedly hyper-secure SWIFT system. The gang responsible had planned to remove $950 million, before a simple error blew their cover. They ended up making off with $81 million anyway, and have been linked to other attacks on banks across Asia.

WannaCry

The profile of so-called ransomware has increased significantly in recent years. Mainly distributed through phishing attacks, ransomware will usually freeze or take control of a computer while the perpetrators demand money for returning everything back to normal.

The WannaCry attack in May 2017 was different, however. It was the first known example of ransomware operating via a worm, i.e. a piece of viral software which replicates and distributes itself. WannaCry spread like wildfire by targeting a vulnerability in older versions of Windows OS which had apparently been identified by the NSA (and kept quiet) years ago. Within days, tens of thousands of businesses and organisations across 150 countries, including the UK's National Health Service (NHS), were locked out of their own systems by WannaCry's encryption. The attackers demanded $300 per computer to unlock the code.

https://securelist.com/ddos-attacks-in-q2-2017/79241/

1. Team NB: This team is a work in progress and building all of the time.

Aonghus O'hEocha, Business Development

Excellent track record working on technology solutions for credit unions since 2012. Successful deployed on-line and mobile banking applications in Ireland and the UK.

Expert on Blockchain Architecture and transaction processing.

Alex Bean

Android and o

Fabio Dantas

Apple Platform Development, Back- end integration.

Caixa Bank

Ken Roy

US Miltary clearance, 225 years development experience TBC

Partners

ICE - TBC

CUNA- TBC

Advisors

Rob

Kraken

Bill Hobbs Central Bank

Reuben Godfrey

Rueben Godfrey is an advisor that is well respected and known in the industry,. Reuben does not have any vested interest in the company.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

The Case for Children

With so many children living in poverty in the world today there has never been a greater need to change this and introduce new ways of tackling this.

BITCUB will provide learning platforms that will help them learn and earn at the same time.

It is our objective to work with hardware suppliers so that we can furnish children all over the world with special leaning phones and tablets where their learning turns into a new digital currency that they can use to alleviate the poverty by providing funds and investing in their future.

Marketing Road Show

BITCUB – WEALTH FOSTERING FOR COMMUNITY

It is our plan to attend conferences for the next 4-6 months, targeting North America, Asia and Europe at a minimum.

Augur started their campaign 6 months prior to their ICO. They raised $5m during their ICO and the market cap is now worth over $200m

ICO more tips

Mike Costache

Mike Costache, advisor to Token As A Service, the first ever "tokenized closed end fund", organizer of a consortium of 50 crypto hedge funds, called the Blockchain Investors Consortium, and co-chair of the d10e conference series, provides several nuggets of ICO wisdom,

'It's important to have holding periods for both the entrepreneurs and the investors, to avoid pump & dump scenarios. This is very similar to the vesting periods for company equity. Instead of all the tokens paying out in one day, pay out a percentage every month over a period of several months or years.'

'Some red flags to avoid are when the management team lies, company videos don't explain the model, there is no MVP, the company hasn't been running long enough, or the company has failed at raising VC after 3 years.'

'It's important to go to the public and find investors early in order to get feedback on the project and the ICO before launching.'

'Need to have great community managers with road shows all around the world. Have content and marketing not just in English, but in Chinese, Arabic, Russian, Korean, Japanese, etc. People are investing from all over the world.'

'And most importantly, once you finish your ICO, be sure to communicate, for instance, having updates at least once a month. You now have a large list of public investors, it is important to keep them engaged.'

https://www.forbes.com/sites/omribarzilay/2017/07/15/tezos-232-million-ico-may-just-be-the-beginning/#2090cd7e4c52

Why Blockchain Is The Future Of The Sharing Economy

Will Blockchain Ignite Fractional Ownership Market For Homes?

BITGUB – WEALTH FOSTERING FOR COMMUNITY

An ICO is simply a process by which cryptocurrency startups raise funds for new ventures. ICOs are similar to crowdfunding, except that they are almost always designed to raise funds for cryptocurrency projects, that might not be eligible for the capital-raising process of banks and venture capitalists. During an ICO campaign, enthusiasts and potential investors will buy some of the tokens of the new cryptocurrency project. Just yesterday, [Tezos announced the largest ICO to date](#), raising $232 million worth of bitcoin (BTC) and ether (ETH) coins, making it the largest ICO to date. Tezos is just a part of the current wave of interesting companies who have already been through or are currently in the process of an ICO.

Meet some other interesting ICOs:

[Augur](#)

Augur is created to be a decentralized prediction market where people can bet on the possible outcome of events – a betting/forecasting platform of sorts. Augur has practically created a betting platform where you can bet on "everything from elections to the destruction of our solar system." if your forecast/prediction is correct, you'll earn rewards in the form of Augur's Reputation (REP) tokens. Augur's ICO helped the firm to raise more than $5.2M in a token sale, with [$2.5M in the first three days](#). Augur has already rewarded its early investors as its REPs currently trade around $26 and the price may continue to rise as more people come on board to the betting platform.

[ChronoBank](#)

Chronobank is another cryptocurrency startup that has found a way to fund its business by holding an ICO. Chronobank is simply the Uber of recruitments as it works on creating an ecosystem where freelance projects are bought and sold with cryptocurrency. When the ICO ended, ChronoBank had raised a total of $5.4M collected in seven cryptocurrencies and USD. Chronobank now has a market capitalization of more than 5,400BTC. The firm's CEO, Sergei Sergienko notes that "we have the funds we need to launch a successful platform and forge the relationships to make ChronoBank a major disruptive force in the recruitment industry".

[Agrello](#)

Agrello is yet to hold its ICO, however, it has the potential to become one of the biggest success stories in the cryptocurrency world for smart investors. Agrello is simply a platform for building legally binding smart-contracts, using AI without having any prior legal skills or knowledge of coding. The Agrello token is called [Delta Δ](#) and it is being offered with Tier 1 at 0.0001Ƀ, Tier 2 at 0.00011Ƀ, Tier 3 is set at 0.00012Ƀ, and Tier 4 is set at 0.00013Ƀ.

One of the key factors that hint at the potential success of Agrello, is its application across a wide range of industries. For instance, Agrello recently inked a partnership deal with Finnish manufacturing giant INCAP, to provide smart agreement prototyping for INCAP's labor management process. Agrello also has a deal with ViewFibn to develop a digital identity engine.

New investment vehicles arrive

Investing in the cryptocurrency market sounds simple enough by buying cryptocurrencies at a low price and selling them off at a higher price. Sophisticated investors may also consider putting their money into ICOs in much the same way that traditional investors look for promising IPO in stocks.

However, as the cryptocurrency markets start to mature, new kinds of investment vehicles and opportunities are coming to the limelight. One of these investment vehicles is the cryptofund, which can be likened to a hedge fund owning different sorts of cryptocurrencies. A cryptofund is simply a portfolio that seeks to make gains by trading cryptocurrencies — some cryptofunds might also be engaged in the mining of cryptocurrencies.

If you want to gain a diversified form of exposure into the cryptocurrency market, cryptofunds can provide you with a smart tool to access these markets. For instance, eToro's CryptoFund, provides access to six unique cryptocurrencies in order to offer a balanced exposure to the cryptocurrency market. The diversification of the fund allows investors to be uniquely positioned to record gains across multiple cryptocurrencies and it protects them against massive losses in any single cryptocurrency.

If you would like to invest directly in startups operating in the cryptocurrency market, you may want to consider investing in Pantera Capital. The firm seeks to provide VC funding to startups working in the blockchain and cryptocurrency industries. By investing with a firm such as Pantera Capital, you'll get a chance to profit from price gains in cryptocurrencies and profit from the success of the firms behind such cryptocurrencies.

https://www.coindesk.com/232-million-tezos-blockchain-record-setting-token-sale/

Medium

https://medium.com/@FundYourselfNow/need-help-with-your-ico-here-are-3-great-tips-d7c624d0a44

The year 2016 saw over US$200 million worth of cryptocurrency investments raised though the ICO (Initial Coin Offering) process. The ICO market has exploded in recent years, with over US$1.5Bn raised in the first half of 2017. ICOs have empowered aspiring entrepreneurs to raise large sums of funding through virtual currencies from global investors over a short period of time. In this article, we would like to share 3 tips for all entrepreneurs who plan to embark on their first ICO. This will be the first series of educational articles written by the team at FundYourselfNow and we aim to help all aspiring entrepreneurs looking for guidance on how they can run their ICO better.

(1) Keep your ICO Secure

Everyday, there are hacking attempts on websites and crypto wallets. If you are running an ICO, be prepared for the possibility of being a target of hackers who will attempt every means and ways to steal user information and money from you and your potential ICO participants.

Just recently, a critical exploit into a smart contract by Parity multi-sig wallet version compromised over US$200M in Ethereum. Hackers successfully stole over $32mil from ICO compromised wallets. In July 2017, an ICO for a project called CoinDash was compromised. Hackers changed the ICO address, which resulted in over US$7mil were stolen from backers.

As illustrated by the above, security should be a top priority for everyone conducting an ICO. Here are some operational security tips that you should consider for your ICO:

1) Use different randomized password for key accounts such as Twitter, Facebook, website, Slack and email accounts. This will ensure that even if one account is compromised, the rest of the accounts are safe.

2) For critical infrastructure such as the web host admin passwords, ensure that passwords are ONLY shared on a need to know basis, with employees that you can trust.

3) Mandate 2-Factor Authentication for your company staff where possible. Twitter, Gmail & Slack has 2FA functions that will stop hackers even if the account password has been compromised.

4) Have a full time community manager monitoring your ICO slack & telegram chats. Check through the member list regularly and proactively ban members with suspicious names (e.g. your company founder name) or throwaway email address (e.g. yopmail email accounts). Educate your slack users to ignore phishing messages sent by slackbot or non-admin users.

5) Release your crowdsale address in advance and inform your community on it. Use the Ethereum name service to purchase an address that can be easily remembered by your community.

6) Use a hardware wallet, such as Ledger Nano S or Trezor to access your ICO smart contract/wallets or store funds. Lock up your wallet in a safe so that it doesn't get stolen or lost.

(2) Free and Effective Marketing

You need good marketing to make your ICO successful. Be sure to take advantage of free public channels to promote your ICO to a large and targeted audience!

Forums Boards

Channels such as Bitcointalk and Reddit are extremely powerful to reach out to the crypto-community. Bitcointalk has the largest crypto-community and ICOs are announced everyday on the Altcoin discussion thread. Having an active thread and presence on bitcointalk months prior to commencing your ICO will go a long way in building up hype and momentum for the project launch. Other ways which you can promote your ICO is via reddit, where you can make your own subreddit, or post information related to your ICO within popular reddit boards such as /r/ethtrader, /r/ethereum and /r/icocrypto.

(3) List your ICO on multiple websites

Listing on ICO websites will help you get the word out quickly. Popular English websites which are free to list include icoalert.com, smith & crown, tokenmarket.net, urbancrypto.com,fundyourselfnow.com (in future) and many more. For an additional cost, you can pay for a premium placement or advertisement slot on the listing website to promote your ICO.

You will also want to look at translating your content and Whitepaper into multiple languages, such as Chinese and Russian. For instance, listing on bizhongchou.com (China) will allow you to get access to Chinese backers.

(4) Give people strong reason to get your tokens

To get backers, you need to explain the rewards that your token holders are entitled to. The most common token model is the utility model, where the token is used to purchase services or products in the platform that the project creator is building. For example, tokens could be used to trade for exclusive weapons & skins in a video game project. This ensures that the token has an inherent value and there will be sustained demand for the token once the platform is launched. As a side benefit, utility tokens tend to be more easily listed as exchanges prefer coins that have transaction volume.

When coming up with the token model, you want to avoid structuring it as an equity/debt token, which will make it a security. Selling securities is a regulated activity in most countries. Examples include token which has a profit sharing or dividend mechanism to reward token holders.

If you enjoyed reading this article, do share and recommend it so others can also enjoy the tips!
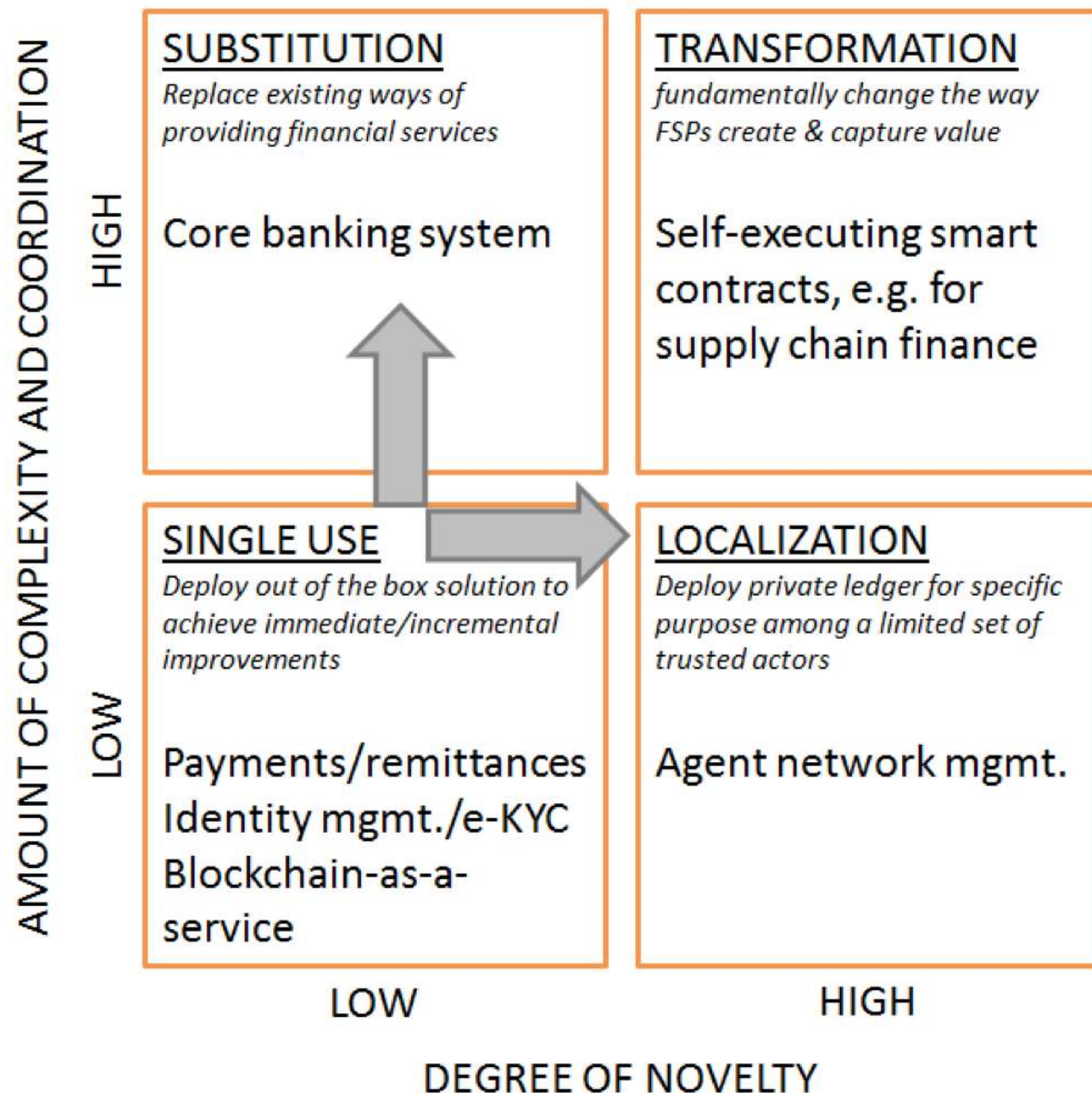
About the Author

The author, Kenneth Tan, is the co-founder of FundYourselfNow.com (FYN), South East Asia (SEA)'s first one stop cryptocurrency crowdfunding platform that leverages on the latest blockchain technologies. Through the FYN platform, project creators can create their own virtual tokens for fundraising and find the talents they need to bring their idea to fruition. If you need help with your ICO, do get in touch with us at contact@fundyourselfnow.com.

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Keen to find out more about FundYourselfNow? Join our crowdfunding revolution conversation on our Slack channel, or follow us on Twitter.

Definitions

Blockchain is a digital infrastructure often described as a distributed ledger technology (DLT). All "transactions" within a given timeframe are validated and recorded as a "block" on "the chain," which replaces a centralized ledger. Blockchain is characterized by transparency, security, privacy, and decentralized control.

AMOUNT OF COMPLEXITY AND COORDINATION

HIGH

SUBSTITUTION
Replace existing ways of providing financial services

Core banking system

TRANSFORMATION
fundamentally change the way FSPs create & capture value

Self-executing smart contracts, e.g. for supply chain finance

LOW

SINGLE USE
Deploy out of the box solution to achieve immediate/incremental improvements

Payments/remittances
Identity mgmt./e-KYC
Blockchain-as-a-service

LOCALIZATION
Deploy private ledger for specific purpose among a limited set of trusted actors

Agent network mgmt.

LOW   HIGH

DEGREE OF NOVELTY

Adapted from "The Truth About Blockchain," by Marco Iansiti and Karim R. Lakhani, January - February 2017, HBR.org

Source

BITCUB – WEALTH FOSTERING FOR COMMUNITY

https://medium.com/accion/how-blockchain-and-financial-services-can-reach-the-underserved-bbe09764a547

Multisig

https://www.youtube.com/watch?v=oUSVmLegj8k

Blockchain replacing core banking

https://www.finextra.com/newsarticle/29170/ex-google-engineer-bids-to-fix-core-banking/blockchain

Low transaction fees

https://www.geckoandfly.com/23532/bitcoin-wallet-low-transaction-fees/

Recent white papers raising more than 10 million

Everex good

Raised 26 million

https://daks2k3a4ib2z.cloudfront.net/59157962bdb4300afa8771a9/5963c09d077a520b5a965208_20170710_EVX_WP.pdf

Peerbanks 42 million

https://peerbanks.org/doc/whitepaper.pdf

Monetha raised 36 million

https://www.monetha.io/Monetha_WP.pdf

Kyber – Exchange

Raised 46 million

https://kyber.network/assets/KyberNetworkWhitepaper.pdf

Existing Systems

Credit Union Stats

UK

http://www.abcul.org/media-and-research/facts-statistics

57,500 worldwide

Great Example

https://peachstatefcu.net/who-we-are/

https://www.woccu.org/newsroom/releases/2014_Global_Credit_Union_iStatistical_Report_i_Available

US Fin Services providers

https://www.cdw.com/content/cdw/en/industries/Financial-Services/financial-services-technology.html

https://www.dh.com/product/credit-union-core

https://www.fiserv.com/industries/credit-union-platforms.aspx

BITCUB – WEALTH FOSTERING FOR COMMUNITY

Flex supply 250 CU's with Core Banking Products

https://flexcutech.com/

http://www.cutimes.com/2017/01/24/credit-union-technology-updates-what-to-watch?page=2&slreturn=1508168871

Miami-based core banking provider NYMBUS

Symitar Episys core system

The updated Partners mobile banking app continues to offer core banking functions such as mobile deposits, transfers and bill-paying, but also has more advanced features, including a section that gives members access to coupons and deals with local and national merchants, an education portal, and a built-in survey tool.

St. Petersburg, Fla.-based CUSO PSCU announced it will be the payments provider for the Marlborough, Mass.-based Cooperative Credit Union Association.

PSCU good reputation for fraud prevention

Lino Lakes, Minn.-based Sharetec System announced the $26 million Evansville (Ind.) Firefighters FCU and $41 million Shreveport, La.-based Post Office Employees FCU selected Sharetec as their new core system provider.

Sharetec System, one of the fastest growing core systems, announced 49 successful credit unions service bureau installations for 2016.

300 cu's in total running Sharetec

Finacle $500,000 – one time cost

https://www.capterra.com/p/59348/Finacle/

Ireland

16 billion in reserves an increase of 2 billion on 2011 figures.

"While the figures for 2016 show evidence of some recovery including growth in lending, the challenge remains that, without other changes including development of products and services, credit unions are unlikely to develop sufficiently to ensure a sustainable business model into the future," commented the Registrar of Credit Unions Anne Marie McKiernan.

She said that credit unions' priority focus in 2017 should be on embedding the benefits of restructuring and making significant progress on building the business models required for future viability.
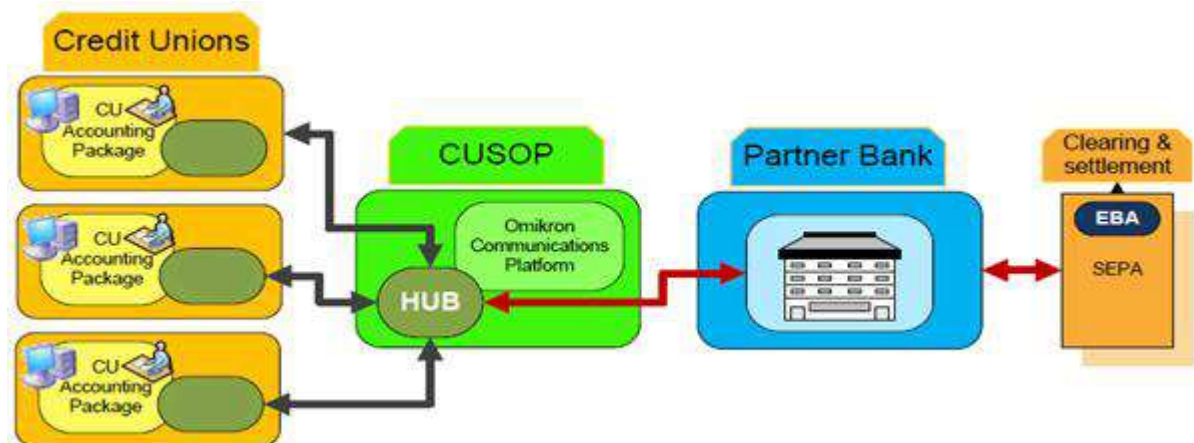
rcuanalytics@centralbank.ie

BITCUB – WEALTH FOSTERING FOR COMMUNITY

https://www.rte.ie/news/business/2017/0224/855135-credit-union-financial-update/

http://cusop.ie/the-service/

http://www.newstalk.com/Central-Bank-says-credit-union-debit-card-breaches-regulations

BNP Paribas, a leader in global banking and financial services, is acting as the clearing agent to manage settlements on behalf of all participating credit unions. BNP Paribas already acts as clearing agent for a number of Irish and foreign banks based in this country and the facility will allow credit union members to mandate their salaries to their credit unions and to pay bills electronically.

Problems

Insufficient funds to meet their liabilities

https://www.bonkers.ie/media/2013/11/21/the-anglo-celt/low-charges--convenience-and-credit---what-s-needed-from-a-bank/295/

Issues with Current Banks

https://www.theguardian.com/business/2014/jun/30/bnp-paribas-pleads-guilty-criminal-charges-sanctions

https://www.irishtimes.com/business/financial-services/danske-bank-exits-personal-lending-with-loss-of-150-jobs-1.1579148

Danske said this morning it is to focus its business towards corporate and institutional clients. Existing personal customer products and services will be phased out during the first-half of 2014.

Issues with Credit Unions – Solvency and Reserves

credit union "is in breach of a number of regulatory directions and is in a distressed financial position".

http://www.irishexaminer.com/breakingnews/business/high-court-appoints-liquidators-to-charleville-credit-union-809779.html

Insufficient funds to meet their liabilities

https://www.bonkers.ie/media/2013/11/21/the-anglo-celt/low-charges--convenience-and-credit---what-s-needed-from-a-bank/295/

Loans ability to repay

http://www.irishexaminer.com/ireland/collapse-of-credit-union-was-just-days-away-249267.html

There was a failure to determine borrowers' financial position or their ability to repay, an absence of a consistent loan application process, inadequate documentation of loans, a failure to consider what other loans borrowers might have with the credit union and a failure to regularly assess how loans were performing.

https://fora.ie/newbridge-credit-union-high-court-3616842-Sep2017/

USA

Technology, Elusive Millennials! staying relevant to younger members, burden imposed by regulatory requirements, interest rates dropping, payments.

https://blog.willis.com/2016/03/the-five-issues-troubling-credit-unions-and-what-to-do-about-them/

Mergers, Loss mitigation and employee retention

http://ghjinc.com/7-unique-challenges-facing-credit-unions/

JARS MONEY MANAGEMENT SYSTEM – PHASE 2

1. Put 55% of your income into NEC or Necessities: rent, food, gas, bills, etc.

2. 10% in Long-Term Savings for Spending, otherwise known as the rainy-day fund. Or maybe there's a car or some other big-ticket item you want to buy. This fund is your most flexible in terms of what you can do with it, but the intention is to do something with it, or that it be there for that just-in-case scenario.

3. 10% for Play. This is for leisurely expenses including sports, movies, general activity and entertainment. Make to sure to spend ALL your play money each month spoiling yourself!

4. 10% for Education. Books, courses, mentoring, coaching, etc. Always educate yourself.

5. 10% for FFA or Financial Freedom Account. This is for investing or anything that is going to make this portion of your money work for you toward passive income streams.

6. 5% for Giving. It's spiritually, ethically, and morally sound practice to give a portion of your earnings toward causes that can use the funding to educate or somehow better other people's lives.

http://www.harveker.com/2015/09/22/stop-waiting-to-manage-your-money-the-habit-is-more-important-than-the-amount/

Glossary

Blockchain

Block

Credit Union

A **credit union** is a financial institution that is owned and controlled by its members rather than shareholders. The members of the credit union pool their deposits and provide loans and other financial services to each other.

http://www.investinganswers.com/financial-dictionary/personal-finance/credit-union-1903

Credit Union Service Organisation

This is when various credit unions come together to achieve economy of scale when purchasing products or services to better serve their members.

Cryptography

A branch of mathematics that deals with ciphers and encryption.

Cryptographers spend their time writing and solving codes that can be used to protect data and to validate its authenticity.

Cryptocurrency

The broad name for digital currencies that use blockchain technology to work on a peer-to-peer basis. Cryptocurrencies don't need a bank to carry out transactions between individuals. The nature of the blockchain means that individuals can transact between each other, even if they don't trust each other. The cryptocurrency network keeps track of all the transactions and ensures that no one tries to renege on a transaction.

Fungibility

In economics, fungibility is the property of a good or a commodity whose individual units are essentially interchangeable. For example, since one kilogram of pure gold is equivalent to any other kilogram of pure gold, whether in the form of coins, ingots, or in other states, gold is fungible.

Bitcoins leave a trace of all preceding and related transactions on the blockchain. It is claimed that "clean bitcoins" are worth slightly more than any other coin on the network, as they have no history linking ownership of the coins to a specific wallet address.

Bitcoin service providers, such as exchanges, can blacklist specific bitcoin wallet addresses. Any coins transferred to and from these addresses are worth less, due to their blacklisted status. The same principle applies to fiat currencies, though. Tracing and monitoring of any currency or asset makes it less than fully fungible. Keeping this knowledge in mind, it is crystal clear bitcoin is not anonymous, nor was it ever intended to be used as such.

Hash

A cryptographic hash is a mathematical function that takes a file and produces a relative shortcode that can be used to identify that file. A hash has a couple of key properties:

It is unique. Only a particular file can produce a particular hash, and two different files will never produce the same hash.

It cannot be reversed. You can't work out what a file was by looking at its hash.

Hashing is used to prove that a set of data has not been tampered with. It is what makes bitcoin mining possible.

Initial Coin Offering (ICO)

An Inital Coin Offering allows an entity to raise capital to fund a project/ campaign with some sort of incentive, e.g. Discounted cost of another currency, extra returns after the a set date or goal has been reached, other benefit, etc

Market Cap

Marketcap is determined by this equation: coins in circulation * price of coin = total marketcap

Mining

The act of producing units of a cryptocurrency (such as bitcoins) through some kind of effort. The effort is required so that people can't just create infinite amounts of the digital currency, which would devalue it. In bitcoin, mining requires computing power.

Peer-to-Peer

Typically, online applications are provided by a central party that organizes all the transactions.

Your bank runs its own computers, and all the customers log into the bank's computer to handle their transactions. If Bob wants to send money to Alice, he asks the bank to do it, and the bank controls everything. In a peer-to-peer arrangement, technology cuts out the middleman, meaning that people deal directly with each other. Bob would send the money directly to Alice, and there wouldn't be any bank involved at all.

Public key

The public key is a string of digits and letters (your bitcoin address). When hashed with a corresponding string known as a private key it digitally signs and online communication.

SHA-256

Every digital currency must have a cryptographic function that dictates how the hash is constructed. In bitcoin, SHA-256 is this function, and is used as the basis for hash creation (i.e bitcoin's proof of work).

Smart contract

a) Smart contracts are computer protocols intended to facilitate, verify, or enforce the negotiation or performance of a contract. Smart contracts were first proposed by Nick Szabo in 1994.

Proponents of smart contracts claim that many kinds of contractual clauses may be made partially or fully self-executing, self-enforcing, or both. The aim with smart contracts is to provide security that is superior to traditional contract law and to reduce other transaction costs associated with contracting. (Ref: https://en.wikipedia.org/wiki/Smart_contract)

Turing complete

In computability theory, a system of data-manipulation rules (such as a computer's instruction set, a programming language, or a cellular automaton) is said to be Turing complete or computationally universal if it can be used to simulate any Turing machine.

A closely related concept is that of Turing equivalence – two computers P and Q are called equivalent if P can simulate Q and Q can simulate P. The Church–Turing thesis conjectures that any function whose values can be computed by an algorithm can be computed by a Turing machine, and therefore that if any real-world computer can simulate a Turing machine, it is Turing equivalent to a Turing machine. A universal Turing machine can be used to simulate any Turing machine and by extension the computational aspects of any possible real-world computer.[NB 1]

To show that something is Turing complete, it is enough to show that it can be used to simulate some Turing complete system. For example, an imperative language is Turing complete if it has conditional branching (e.g., "if" and "goto" statements, or a "branch if zero" instruction; see one instruction set computer) and the ability to change an arbitrary amount of memory (e.g., the ability to maintain an arbitrary number of variables). Since this is almost always the case, most if not all imperative languages are Turing complete if the limitations of finite memory are ignored.

https://www.thebalance.com/bitcoin-glossary-391211